PRUNE SUPPLY AND PRICE SITUATION

S. W. SHEAR

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SUMMARY AND CONCLUSIONS

As a result of increasing production, the California prune industry is faced with the probability that, on the average, prune prices will be unprofitably low for an unusually large percentage of growers for several years, unless growers, selling agencies, and others financially interested in the industry greatly improve the methods and reduce the costs of marketing and succeed in eliminating the more inferior part of potential production from competition with the better grades of table prunes, and unless growers themselves drastically reduce costs of production.

Production.—Increasing California production is the major cause of the upward trend in the commercial prune output of the world. During the five years 1923–1927, the state produced over 65 per cent of the average world commercial production (excluding Jugoslavian domestic consumption) of about 230,000 tons; Jugoslavia produced nearly 20 per cent; our Pacific Northwest slightly over 10 per cent; and France about 5 per cent. Average world commercial production of dried prunes in recent years has been about 70 per cent greater than in the period 1909–1913 and about 30 per cent larger than in 1904–1908.

French production, although rather variable, has averaged nearly 12,000 tons during the last five years, or only about one-half of the pre-war average and there seems to be no prospects for an increase in normal output.

Jugoslavian post-war average commercial output (exported surplus) of about 40,000 tons is about 30 per cent greater than the 1909–1913 average but approximately 40 per cent less than for 1904–1908, the period of maximum exports from the prune-producing areas now included in Jugoslavia. The limited available evidence indicates that Jugoslavian prunes will probably continue to offer as much competition to our prunes, on the average, as in recent years. Although there has been no noticeable upward trend in production and exports of dried prunes in that country since 1920, there is a possibility of a slight increase in the near future.

The production and bearing acreage of prunes in California have just about kept pace with one another in recent years. Should production during the next few years continue to keep up with forecasted bearing acreage, the production may conservatively be estimated at an average of 190,000 tons a year for several years, an increase of about 36,000 tons over the average of the last five years.

If commercial production in France and Jugoslavia should remain at an average of about 50,000 tons during the next few years, the Pacific Northwest increase to 30,000 tons, and California average 190,000 tons, world commercial dried-prune production, which has averaged about 230,000 tons during the last five years, would average 270,000 tons over a period of several years, or as large as the world output of 1927.

International Trade.—An average of over half of world production of dried prunes now enters into export trade. During recent years over 62 per cent of average world exports of 260 million pounds has come from the United States. California alone contributed 55 per cent and Jugoslavia about 34 per cent of this international movement. United States exports have increased rapidly during the last thirty years. Since the war an average of over 45 per cent of the country's production has been exported.

Western Europe, the greatest consumer of dried prunes, has imported nearly 95 per cent of world exports in recent years and approximately 90 per cent of United States exports. Germany is by far the greatest importer of prunes, taking about 27 per cent of world exports from 1923 to 1927 and approximately 25 per cent of our exports. In Germany our prunes meet the keenest competition

from Jugoslavian prunes, which are of a poorer quality than ours but normally sell at substantially lower prices. German imports of prunes from the United States usually vary almost inversely with imports from Jugoslavia. The big fluctuations in Jugoslavian production and exports, therefore account to a considerable extent for the violent variations in German prune imports from the United States. Most Jugoslavian prune exports go to neighboring European countries. There has been a decided tendency for those to Czechoslovakia to increase in recent years. If this tendency continues it may, by diverting foreign prunes which would otherwise go to Germany, result in an increase in German imports of our prunes. The decline which has taken place in prune production in France has resulted in a big increase in her imports from California and placed her third among importers of our prunes in recent years.

Size and Quality.—For many years California prunes have been graded into three classes according to quality and ten groups according to size. There is an apparently desirable tendency among distributers to adopt only three major size classes of prunes—large, medium, and small. The interior valleys produce only a very small percentage of prunes of as high a quality, judged by present trade standards, as the majority of prunes produced in the coastal-valley districts of the state. Proper cultural, harvesting, and drying practices would improve both the size and quality of many prunes produced in interior-valley orchards.

It seems desirable that all factors in the prune industry encourage the production of large prunes of superior quality by placing the proper price premiums on them, and discourage the production of prunes of small size and of inferior quality by adequate price penalties. The market supply of prunes for table use could be reduced 10 to 20 per cent if poor-quality fruit and sizes 90 or smaller were kept off the market in years of abnormally large and unprofitable world crops. Growers in localities that are not adapted to the economical production of prunes of good quality and of medium size or larger would benefit themselves and the industry by turning to other enterprises or occupations in which there are possibilities of making a better living.

During the last twenty years the proportion of California prunes 40 to 50 to the pound or larger has shown a notable increase, due chiefly to the fact that much of the expansion of production has taken place in those coast and Sacramento Valley counties which produce a big percentage of large prunes. The proportion of 50/60's has remained fairly constant, while 60/70's or smaller have declined in

relative importance. An average of about 40 per cent of recent crops has been 40/50's or larger; about the same proportion has been 50/60's; and approximately 20 per cent smaller sizes. Variations in the output of 50/60's and 60/70's are relatively small. The greatest fluctuations occur in the case of larger sizes.

Consumption.—In this country prunes nearly all reach the consumer in the dried form. Prune pulp and dried prunes canned in syrup and in wine, however, are relatively new products which can be cheaply packed and for which extensive markets may be built up once the technical problems involved in packing them have been satisfactorily solved. Unfortunately, the probability that these problems will be solved in time to help much in relieving the industry of the present burden of low prices caused by over-production, seems remote.

Because of increased world production, the total and the per-capita consumption of dried prunes and of dried fruits in general has substantially increased in most of the chief dried-fruit-consuming countries since pre-war years. The United States consumption of dried fruits in post-war years of 6.7 pounds per capita is 50 per cent greater than the pre-war average and is larger than that of all but a half dozen of the more important foreign markets. Nearly 25 per cent of it (1.6 pounds) now consists of prunes. The peoples of the United States, Canada, New Zealand, and Argentina and of most of the countries of northwestern Europe now consume a pound or more of dried prunes per capita annually and nearly all of them have shown a decided increase in per-capita consumption since pre-war days.

Price Outlook and Problems of Adjustment.—In the past, substantial increases in prune production have practically always made a cut in prices necessary in order to induce consumers to eat more prunes. The rough data available indicate that nearly 75 per cent of the changes in crop-year average wholesale prices of California prunes in the New York market can be accounted for by variations in approximate world consumption, except in very abnormal years such as 1919–1921.

If the forecasted production of prunes actually matures and reaches the market during the next few years, prices will have to be low to induce consumers to use all the available supply or else growers, selling agencies, and others financially interested in the industry will have to unite in a determined and constructive remedial program. Such a program would involve measures (1) to reduce the acreage and commercial production of prunes, (2) to lower production costs, (3) to improve size and quality, (4) to eliminate small and inferior

prunes from consumption as table fruit, (5) to reduce costs of marketing, (6) to improve and widen distribution, and (7) to stimulate foreign and domestic demand.

Even though extraordinary improvements were to be made in marketing prunes during the next few years, it is improbable that the net result would be sufficient to entirely overcome the depressing effect of heavy production of prunes and of other competing fruits upon prices. Marketing improvements will be worth working for, however, for they should result in higher prices than the grower would be able to get without them. The test of the value of efforts to improve distribution will be whether prices are better than they would have been had no such changes been made, and not whether prices are actually higher during the period in which the improvements are in effect.

To attempt to hold prices too high during the next few years will result in carryovers and other complications which will only add to the troubles of the industry. The experience with carryovers which the raisin, the canning-peach, and the prune growers themselves have had should convince them that it is usually suicidal to hold prices high enough to cause carryovers from one crop year into the next during a period in which average production is large. These experiences also indicate that practically a 100 per cent support by the growers in an industry is necessary for the group even to have a chance to succeed in limiting the supply of a commodity put upon the market and completely eliminating the rest of the supply from competing market channels through by-products or other methods of disposal. Because of the peculiar economic nature of agriculture such unified action is exceedingly difficult if not impossible to accomplish in most instances.

OBJECT OF STUDY

The present study has been made because prune growers of the state are interested in getting at the facts regarding the economic situation of their industry and the outlook for it. The analysis of the available statistics on prune acreage, production, sizes and grades, carryover, consumption, foreign trade, and prices which is presented herein should lead those interested in the industry to a better and more general understanding of the problems which confront the industry, and by so doing it should result in more rapid and effective solution by individual and cooperative effort. When considered in the light of the specific information which individuals in the industry have available regarding their own particular situation, the facts

presented in this bulletin should be helpful to growers, as well as others in deciding what it is best for them to do under the circumstances that confront them.[3]

VARIETIES OF PRUNES

From the point of view of the dried-prune industry, which is under consideration in this bulletin, a prune is a plum which will not ferment when dried without the removal of the pit[4] and usually includes only plums having a high percentage of sugar. Only a very few plums not of the type called prunes are dried after being pitted and the dried product is tart in flavor and the demand for it slight.

Most American-born consumers are familiar with, and hence prefer, the varieties of prunes grown in California, which are decidedly sweet in taste when dried. Their flavor differs noticeably from the tart or subacid flavor of the Italian (Fellenberg) variety, which constitutes the bulk of the dried product of the Pacific Northwest. The tartness of Italian prunes is due to a larger acid content and slightly smaller sugar content. The popular impression that because of its tart flavor the Italian prune has a much smaller sugar content than the California French prune is incorrect.[5] The flavor of the Italian prune is similar to that of the prunes exported from Jugoslavia, to which most of our population born in Europe are accustomed.

The chief varieties of prunes grown in California are the French (Prune d'Agen, Petite Prune), Robe de Sergeant, Imperial, and

[3] The farm-efficiency studies which the Extension Division of the College of Agriculture is conducting in a number of counties are supplying California growers with much needed information about the relation of farm costs and profits, and are resulting in better orchard practices in many sections of the state. A marketing study dealing with the possibilities of widening the market for prunes and cheapening distribution costs is now being carried on jointly by the Division of Agricultural Economics of this College of Agriculture, the Division of Markets of the State Department of Agriculture, and the Bureau of Agricultural Economics of the United States Department of Agriculture. The Division of Markets of the State Department of Agriculture at Sacramento has recently instituted a market news service on prunes which is designed to make available to prune growers more and better information regarding current changes in prices and production and the marketing situation in general.

[4] Wickson, E. J. California fruits. *p. 269* (10th ed.) Pacific Rural Press, San Francisco, 1926. Some aspects of the economic status of, and the outlook for, the fresh-plum industry is treated in: Rauchenstein, Emil. Economic aspects of the fresh plum industry. California Agr. Exp. Sta. Bul.459:1–26. 1928.

[5] Information concerning the comparative sugar and acid content of Italian and French prunes are summarized in: Critchfield, B. H. Demand, marketing, and production of Oregon and Washington prunes. U. S. Dept. Agr. Dept. Circ. 416:13. 1927. Data in this are based upon: Colby, G. E. Investigation of California prunes, apricots, and peaches. California Agr. Exp. Sta. Bul. 97:8. 1891; and upon: Shaw, G. W. The Oregon prune. Its composition, food value, soil draught. Oregon Agr. Exp. Sta. Bul. 61:18. 1900.

Sugar.[6] The *French* prune, the most important commercial variety grown in California, is found in all the prune-producing sections of the state. Except for its tendency to produce only medium to small-sized fruit, it is probably unsurpassed in California. Its quality is usually excellent. The fact that price differentials favor large-sized prunes more than formerly,[7] however, has encouraged the planting during the last decade of an increased proportion of varieties which produce large sizes.[8]

The *Robe de Sergeant*, which is extensively planted in some of the interior valley sections, resembles the French in size and quality when dried and is usually sold as such. Because it is a light bearer, it has been planted but sparingly, particularly in the coast valleys.

The *Imperial,* which produces the largest size of prunes, is planted in certain parts of the Santa Clara Valley and in the coast counties north of the Bay. The fruit is large and of excellent quality, but the tree is a notoriously shy bearer, except in a few favored localities particularly in the counties north of the Bay.

The *Sugar* prune is grown in certain sections, especially in the hot interior valleys. Although a heavy bearer it has a pronounced tendency to alternate bearing. Likewise, the dried fruit, although frequently of a large size, is mediocre in quality, being somewhat coarse and stringy.

CALIFORNIA PRUNE-PRODUCING DISTRICTS[9]

Location and Relative Importance.—California prune production is largely concentrated in four important districts. (See figure 1.) The largest, oldest, and, as a whole, the most concentrated is the coast district[10] south of San Francisco Bay, which extends from Contra

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[6] The following brief discussion of the chief varieties of prunes grown in California is based on: Hendrickson, A. H. Prune growing in California. California Agr. Exp. Sta. Bul. 328:32, 33. 1923. A new circular on plum and prune culture in California is now being prepared by F. W. Allen.

[7] See brief discussion page 58.

[8] In the absence of any available statistics on plantings of prunes by varieties, the analysis of data showing the trend in production of prunes of different sizes, and the relative distribution of prunes by sizes in different counties of the state, as discussed on pages 37–41, should prove valuable.

[9] For a brief description of the important characteristics of the chief prune-producing districts of the Pacific Coast see: Kinman, C. F. Plum and prune growing in the Pacific states. U. S. Dept. Agr. Farmers' Bul. 1372:1–12. 1924.

[10] The districts referred to in this bulletin for the sake of brevity as the coast districts north and south of San Francisco Bay are not on the coast proper but in the small valleys near the coast such as the Santa Clara, Santa Rosa, and Napa valleys.

Costa to San Benito County and includes the famous Santa Clara Valley, in which the California industry had its beginning. It contains about 44 per cent of the total prune acreage in the state. (See figure 2.) The greater part of the acreage in the second largest dis-

California Prune Acreage, 1928
Total of Bearing and Non-bearing by Counties

County	Acres	Per cent
Santa Clara	69,961	35.8
Sonoma	27,079	14.0
Napa	12,050	6.2
Tulare	9,856	5.1
Butte	8,383	4.3
Sutter	8,241	4.3
San Benito	7,802	4.0
Solano	5,564	2.9
Colusa	5,337	2.8
Glenn	4,203	2.2
Tehama	4,183	2.2
Sacramento	3,957	2.0
Yolo	3,457	1.8
Contra Costa ...	2,626	1.4
San Luis Obispo.	2,580	1.3
Alameda	2,000	1.0
San Joaquin	2,075	1.1
Yuba	2,092	1.1
Other counties..	11,535	6.5
Total	192,981	100.0

Each dot represents 1000 acres.

Fig. 1.—California prune production is largely concentrated (1) in the Santa Clara Valley south of San Francisco Bay, (2) in Napa and Sonoma counties north of the Bay, (3) in the Sacramento Valley, and (4) in Tulare County in the San Joaquin Valley. (Data from table 12, page 66.)

trict, just north of San Francisco Bay, is concentrated in Napa and Sonoma counties. About 25 per cent of the state acreage is in this section. The acreage in the Sacramento Valley, about 22 per cent of the state total, is somewhat scattered, stretching from Shasta County on the north to San Joaquin County on the south. The small prune-producing area centering in Tulare County in the southern part of the San Joaquin Valley contains only about 6 per cent of the prune acreage of the state. Outside of these four districts, which account for nearly 98 per cent of the 193,000 acres of prunes (bearing and non-bearing) in California, there are less than 5,000 acres of scattered plantings.[11]
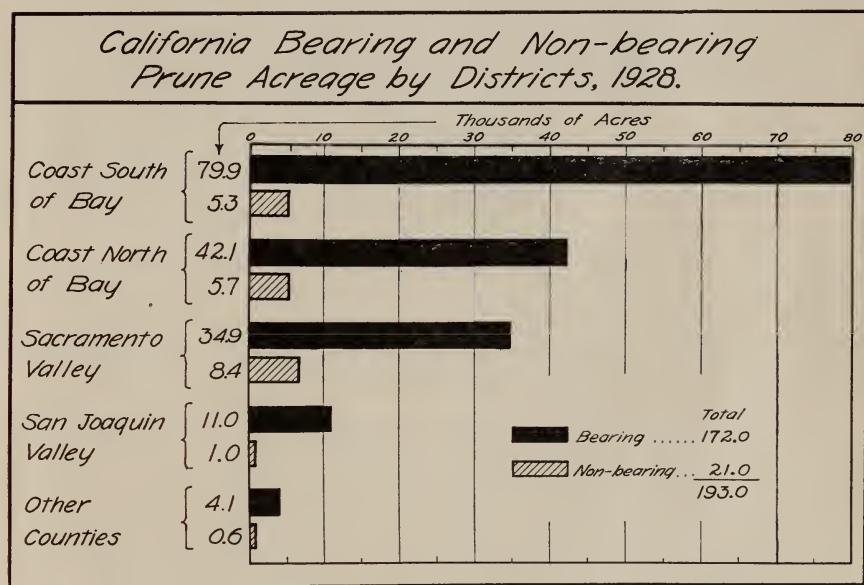
Fig. 2.—Over 90 per cent of the bearing prune acreage of California is in the coast districts north and south of San Francisco Bay and in the Sacramento Valley. The district south of the Bay outranks the others in bearing acreage, but the Sacramento Valley has the largest area of trees not yet in bearing. (Data from table 12, page 66.)

Expansion of Bearing Acreage, 1921–1928.—The black portions of the bars shown in figure 3 indicate that from 1921 to 1928 the greatest expansion in bearing prune acreage in any section of the state occurred in the coast district south of San Francisco Bay. The increase of 27,700 acres amounted to an addition of approximately 53 per cent

[11] County data on bearing and non-bearing acreage similar to those discussed by districts are given in table 12, page 66.

to the bearing acreage of 1921. Expansion of bearing acreage in the section north of the Bay and that in the Sacramento Valley have been about equal since 1921, amounting to about 17,500 acres in the former and 17,800 in the latter. The proportional increase, however, has been greater in the Sacramento Valley, approximating 104 per cent from 1921 to 1928 compared with 71 per cent in the coast district north of San Francisco Bay. There has been only a slight increase in bearing acreage in other sections of the state in recent years. In the lower San Joaquin Valley the expansion since 1921 has been less than 20 per cent, amounting to less than 2,000 acres. In the period 1921–1928 the bearing acreage of the state as a whole increased by nearly 66,000 acres, or approximately 62 per cent.
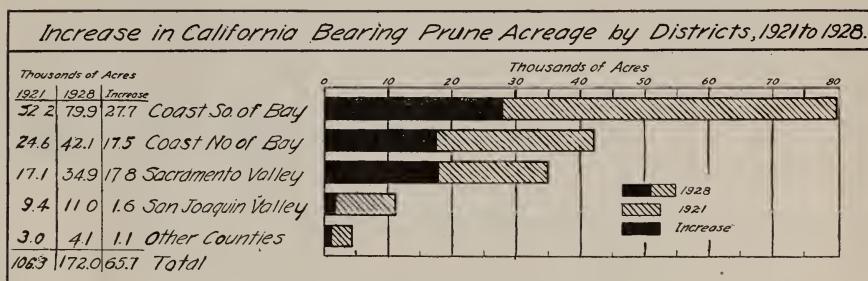
Fig. 3.—The bearing acreage of prunes has increased greatly in the coast districts and in the Sacramento Valley since 1921. (Data from table 12, page 66.)

Rank in Yields per Acre.—The very limited available statistical data regarding prune yields per acre in the different sections of the state confirm the general impression of those most familiar with the industry. The lower San Joaquin Valley apparently produces the highest yields per acre followed by the Sacramento Valley district, the coast district south of San Francisco Bay, and the coast district north of the Bay, in the order named. The very fact that the industry has grown but little in the high-yielding southern San Joaquin Valley area shows that other factors than yield are of decisive importance in determining the profitableness and the expansion of prune production in different sections of the state. The prunes produced in this district, on the whole, average too small in size and low in quality to bring a satisfactory return in periods of low prices such as the present. The same is also true of a few counties in the Sacramento Valley, although several counties[12] produce a large percentage of medium and large-sized prunes.

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[12] See discussion pages 40 and 41.

Indications of Future Increases.—Judging by the 1928 non-bearing acreage (see table 12, page 66) the greatest increase in bearing acreage and production is to be expected from the Sacramento Valley, which contains 40 per cent of the 21,000 acres of prune trees in the state not yet in bearing. The coast district north of San Francisco Bay contains 27 per cent of the non-bearing acreage of the state, and the district south of the Bay about 25 per cent, while the San Joaquin Valley accounts for barely 5 per cent.

Relatively, as well as absolutely, the bearing acreage of prunes in the Sacramento Valley should increase more rapidly than that of any other section of the state, judging by the percentage the non-bearing acreage is of the bearing acreage. The acreage in this section in 1928 still to come into bearing amounts to 24 per cent of the present bearing acreage, in comparison with 14 per cent in the coast district north of San Francisco Bay, 9 per cent in the lower San Joaquin Valley, and only 7 per cent in the coast district south of the Bay. In the state as a whole an equivalent of 12 per cent of the 1928 bearing acreage is not yet of bearing age.

PRODUCTION IN CALIFORNIA

Expansion Since 1850.—Although the prune tree was introduced into California about 1850, it was not until between 1880 and 1890 that the crop began to assume commercial importance. The state production in 1890 was estimated at less than 10,000 tons, and at that time a large part of the prunes consumed in the United States were imported from France and Bosnia. For at least a decade thereafter California production expanded rapidly, reaching nearly 100,000 tons in 1902 (see table 2, page 19). With the growth of California output, imports of prunes into the United States had declined to less than 500 tons by 1896 and exports had risen to nearly 8,000 tons. From 1902 to nearly 1910 the trend of prune production in California was downward. Trade estimates indicate that the production of the state in the decade 1900 to 1910 averaged about 66,000 tons, which constituted about 40 per cent of the commercial production of the world. Since 1910 the trend of production in the state has been upward and most rapid since the war.

During the same period Pacific Northwest production has showed a gradual upward trend. French production, however, has declined greatly since the decade before the war and Jugoslavian production has decreased to some extent. The net result is that California now produces about two-thirds of the commercial production of the world.

Increase in Bearing Acreage Since 1910.—The meagre data available indicate that in the decade from 1910 to 1920 the prune industry was expanding in every important district of the state with the exception of the coast district south of San Francisco Bay. During this ten-year period the bearing acreage and the production of the state as a whole seem to have increased between 40 and 50 per cent. Most of the expansion occurred in the coast district north of San Francisco Bay and in the Sacramento Valley, and a small part in the southern portion of the San Joaquin Valley.[13]

TABLE 1

CALIFORNIA PRUNE PRODUCTION, BEARING ACREAGE, AND YIELDS, 1914–1928, AND FORECAST OF BEARING ACREAGE 1929–1931

Year	Bearing area		Production		Yield per bearing acre, tons
	Thousands of acres	Per cent of average	Thousands of tons	Per cent of average	
	1	2	3	4	5
AVERAGES					
1916, '17, '19, '20, '21....	103.8	100	104	100	1.00
1923–1927	141.6	136	154	147	1.08
1914	82.9	80	56	54	0.68
1915	91.5	88	92	89	1.02
1916	101.2	97	79	75	0.78
1917	102.3	98	109	105	1.07
1918	103.0	99	45	43	0.44
1919	104.0	100	135	129	1.30
1920	105.0	101	97	93	0.93
1921	106.3	102	100	96	0.94
1922	111.4	107	130	125	1.17
1923	119.4	115	130	125	1.09
1924	128.7	124	139	133	1.08
1925	138.8	134	146	140	1.05
1926	156.0	150	150	144	0.96
1927	165.2	159	203*	195*	1.23*
1928	172.0	166	185*	178*	1.08*
1929	177.9	171			
1930	181.0	174			
1931	182.0	175			
1932					

* Data for 1927 and 1928 are preliminary and subject to revision.

Sources of data:

Cols. 1 and 3.—Latest revised data, compiled from Annual Reports of the California Crop Reporting Service.

Cols. 2 and 4.— Relatives expressed as a percentage of the five-year average 1916, 1917, 1919, 1920, and 1921.

Col. 5.—Computed from cols. 1 and 3.

[13] This paragraph is based upon county acreage data from the federal censuses of California of 1910 and 1920 and from reports of the county horticultural commissioners as compiled by the California State Commission of Horticulture and published (in most cases) in its Monthly Bulletin.

The solid black line pictured in figure 4, page 16 (see also table 1), shows how rapidly bearing acreage of California prunes has been increasing since 1914. Expansion was relatively slow before 1921. For several years right after the war, however, plantings were, unfortunately, greatly stimulated by the seemingly relatively high returns which growers received for prunes.[14] So many trees have come into bearing since 1921 that the bearing acreage has increased about 62 per cent. The resulting expansion in production has caused a serious decline in growers' returns. By 1931 the present bearing acreage of 172,000 will probably have grown to about 182,000 acres, representing an increase of over 75,000 acres within the decade since 1920.

Yield per Bearing Acre.—The data of the California Crop Reporting Service in table 1 show that since 1914 the average yield of dried[15] prunes in the state per bearing acre[16] has varied from as low as 1,400 pounds to as high as 2,600 pounds. The apparently low yield of less than 900 pounds per acre in 1918 was not due to the fact that the trees bore lightly but was caused by early rains, which ruined approximately half of the crop during the period of harvesting and drying in September.[17] Table 1 shows that there were no violent fluctuations in the average yields for the state during the period 1920–1926, the range being only from 1,900 to 2,200 pounds per acre. Yields in 1919

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[14] See discussion of prices on pages 47–49.

[15] It usually takes between 2.4 and 2.5 pounds of fresh French prunes (which constitute the bulk of the California crop) to make one pound of the dried product, the drying ratio depending in part on the maturity of the fruit and the conditions under which it is dried. (Cruess, W. V. Commercial fruit and vegetable products. *p. 344, 345.* McGraw-Hill Book Co., New York. 1924.) The large varieties, such as the Imperial and Sugar, dry away considerably more than the French. ''In the coast counties of the drying ratio ranges from 2:1 to $2\frac{1}{2}$:1 and in the interior valleys and southern California from $2\frac{1}{2}$:1 to 3:1, the state average being nearly $2\frac{1}{2}$:1.'' (Christie, A. W., and L. C. Barnard. The principles and practice of sun-drying fruit. California Agr. Exp. Sta. Bul. **388**:7. 1925.)

[16] The age at which prune trees come into bearing varies greatly in different sections of the state. In estimating future increases in bearing acreage, trees are generally considered to come into bearing at about six years of age. Hendrickson states that in a period of normal prices ''a sustaining crop of prunes is not ordinarily produced until the trees are six or seven years old.'' (Hendrickson, A. H. Prune growing in Cailfornia. California Agr. Exp. Sta. Bul. **328**:37. 1923.) Prune trees come into *full* bearing between ten and fifteen years of age.

[17] Cruess, W. V. Salvaging rain-damaged prunes. California Agr. Exp. Sta. Cir. **212**:1. 1918 (reissued 1921). Many growers who have suffered losses from prunes being damaged by rain while being sun dried are dehydrating their prunes, that is drying them artificially in evaporators. Statistics on the tonnage of prunes dehydrated annually in California, 1921–1925, and data on the comparative quality, yield, and costs of sun-drying and dehydrating are given in: Christie, A. W. The dehydration of prunes. California Agr. Exp. Sta. Bul. **404**:1–17. 1926.

and 1927 were abnormally large. Present indications are that those of the 1928 crop will be somewhat above average. Average yields for 1923–1927 have been nearly 2,200 pounds.

OUTLOOK FOR CALIFORNIA PRODUCTION

Figure 4 and table 1 show that the upward trend of prune production in California since 1910 has been just about as rapid as that of bearing acreage. The two curves in figure 4, picturing production and bearing acreage, are so related that points indicating crops above average in size are above the curve of relative bearing acreage and
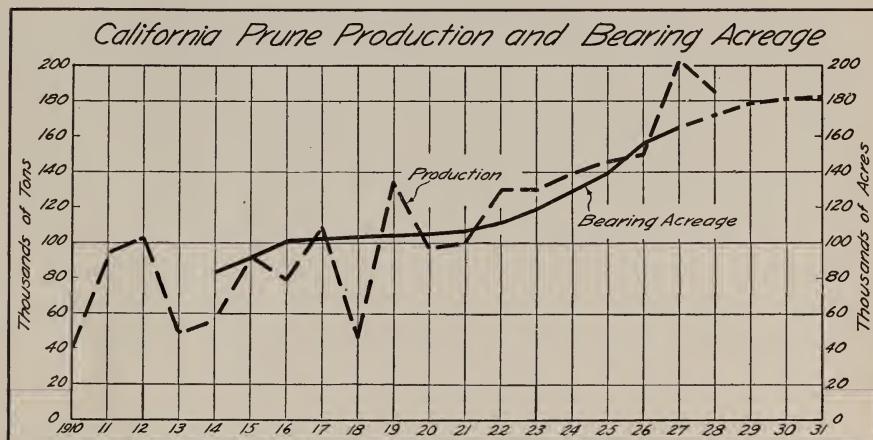
Fig. 4.—The bearing acreage of prunes in California will apparently continue to increase for several years, and average production likewise, if average yields per acre do not decline greatly. (Data from table 1, page 14, and table 2, page 19.)

those below average fall below this curve. As long as yields per bearing acre average approximately what they have during the last decade, future production should tend to fluctuate above and below the curve of relative bearing acreage, depending upon whether a crop is above or below average in size.

Since 1920 both bearing acreage and production have expanded rapidly, but the forecasted increase in bearing acreage, shown in figure 4, indicates that the increase in production will not be as rapid during the next few years unless yields per acre are greater than they have averaged since the war. On the basis of the curve of forecasted bearing acreage, California production may conservatively be estimated at an average of about 190,000 tons a year for several years, compared with the 166,000 ton average of the last three years, 1925–1927. Unless something unexpected happens it is probable that

the average prune production[18, 19] of California will have increased approximately 75 per cent in the decade from 1920 to 1930.

Variables Which May Affect Average Future Yields.—In considering this forecast of the probable future average production of prunes it should be remembered that it is based on average yields per acre in recent years. If low prices prevail in the prune industry for several years the production of the state and average yields per bearing acre may be reduced below this average. During the next few years some trees will doubtless be neglected and some acreage abandoned or pulled out. One must also consider the possibility that the ''die-back'' of prunes may reduce the acreage and production of prunes noticeably in certain localities in the state in the future. Economizing on production costs is likely to decrease the yields of some orchards. The proportion of bearing acreage not yet in full bearing and the amount coming into bearing that is planted on heavy or light-yielding sites obviously will also affect average yields in the future, but how much no one knows. A detailed census enumeration would be necessary to secure such facts. In Oregon the increasing yields from young bearing trees as they approach full-bearing age indicates a substantial increase in production even though no more trees come into bearing for several years.

PACIFIC NORTHWEST PRODUCTION OUTLOOK

The production of dried prunes in Oregon and Washington fluctuates greatly from year to year but has averaged nearly 25,000 tons during the last three years (see table 2, page 19). Critchfield, who has carefully studied the Pacific Northwest prune situation, states that ''taking into account the per-acre production of trees of different ages, it is estimated that there will be an increase of about 15 to 20 per cent in the average annual production of northwestern prunes when all of these trees are in full bearing,'' which will be within the next six or seven years.[20] Production may, therefore, average over 30,000 tons within a few years.

[18,19] This rough forecast of average production does not apply to any one year but refers to an average of at least three years. Actual production in any given year included in the period of years for which the forecast is made may be considerably above or below the predicted average, since yields per acre may change greatly from year to year, making it impossible ordinarily to predict as much as a year ahead of time what the approximate yield per acre for any particular year will be. However, one can estimate with a fair degree of accuracy what average yields over a period of several years may be, judging largely by average yields in the past.

[20] See Critchfield, B. H. Demand, marketing, and production of Oregon and Washington prunes. U. S. Dept. Agr. Dept. Circ. 416:35–39. 1927.

WORLD PRODUCTION OUTLOOK

Considering the outlook in both California and the Pacific Northwest it seems that the trend of United States production of dried prunes may be upward for several years. Unless an unusually large mortality in acreage occurs or average yields per acre decline appreciably, national production of prunes during the next few years may average in the neighborhood of 220,000 tons a year. If production in France should remain at an average of about 10,000 tons, and Jugoslavian exports at approximately 40,000, world commercial production of dried prunes, which has averaged about 230,000 tons in recent years (see table 2, page 19), may average 270,000, or as large as the crop of 1927, over a period of several years.
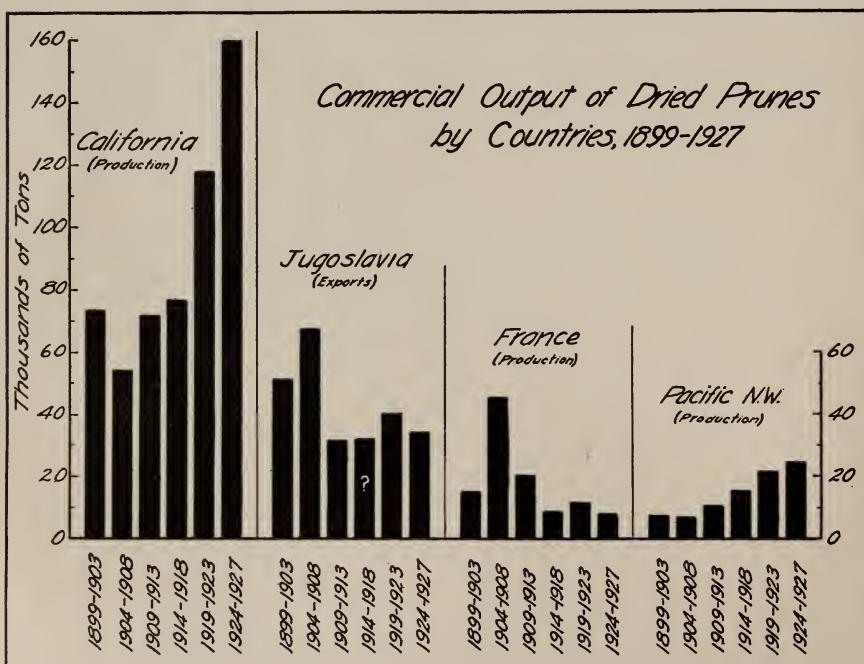

Fig. 5.—Prune production in France has declined greatly during the last twenty years. In California and the Pacific Northwest it has expanded noticeably, and most rapidly in California. The output of Jugoslavia reached its peak in 1904. Its average since the war has been considerably greater than the 1909–1913 average. (Data from table 2.)

TABLE 2

COMMERCIAL PRODUCTION OF DRIED PRUNES BY COUNTRIES, 1898–1928

Year	Pacific Northwest production	California production	U. S. total production	Jugoslavia exports	France production	World total
1	2	3	4	5	6	7
			Thousands of short tons, i.e., 000 omitted			
1898	8.5	45.2	53.7	45	44.0	143
1899	1.5	57.1	58.6	55	10.0	124
1900	5.0	87.0	92.0	49	45.0	186
1901	12.0	40.8	52.8	42	10.0	105
1902	6.5	98.5	105.0	70	5.5	180
1903	15.0	82.5	97.5	37	2.7	140
1904	3.0	67.5	71.5	108	58.8	238
1905	5.5	31.3	36.8	50	45.5	132
1906	7.5	92.5	100.0	55	40.0	195
1907	12.0	53.0	65.0	35	36.8	137
1908	8.0	28.5	36.5	85	47.2	169
1909	15.0	75.0	90.0	15	44.7	150
1910	10.0	40.0	50.0	35	9.0	94
1911	11.5	95.0	107.0	50	13.1	170
1912	4.0	102.5	106.5	5	19.5	131
1913	14.0	48.0	62.0	48	13.9	124
1914	5.3	56.0	61.3	....	14.1	....
1915	9.3	92.5	101.8	....	13.8	....
1916	21.3	78.5	99.8	....	5.3	....
1917	11.5	109.0	120.5	....	7.6	....
1918	30.5	45.0	75.5	....	1.2	....
1919	17.5	135.0	157.5	....	5.8	....
1920	17.5	97.5	115.0	53	13.9	182
1921	13.3	100.0	113.3	26	6.4	146
1922	36.0	130.0	166.0	57	2.4	225
1923	25.0	130.0	155.0	62	29.7	247
1924	25.0	139.0	164.0	5	9.0	178
1925	13.0	146.0	159.0	48	4.0	211
1926	45.0	150.0	195.0	52	9.4	256
1927	23.0	203.0	226.0	34	9.3	269
1928	2.3*	185.0*	187.3*	28*	1.5*	217*
AVERAGES						
1899–03	8.0	73.2	81.2	51	14.6	147
1904–08	7.2	54.6	62.0	67	45.7	174
1909–13	10.9	72.1	83.1	31	20.0	134
1923–27	26.2	153.6	179.8	40	12.3	232
			Per cent of world total			
1899–03	5.4	49.8	55.2	34.7	9.9	100
1904–08	4.1	31.4	35.6	38.5	26.3	100
1909–13	8.1	53.8	62.0	23.1	14.9	100
1923–27	11.3	66.2	77.5	17.2	5.3	100

* Data for 1928 are preliminary estimates from: California Division of Markets, Prune Market Information Bul. **11**, (mimeo.) Nov. 17, 1928.

Sources of data:

Col. 2.—Figures through 1926 compiled from California Fruit News and Reports of the Oregon State Board of Horticulture, the earlier figures being rough estimates made in most cases by the trade or by Oregon county horticultural inspectors. Data for 1927 from: California Division of Markets, Prune Market Information, Bul. 11 (mimeo.), Nov. 17, 1928.

Col. 3.—Data through 1918 compiled from 'trade' estimates made by the editor of, and published in, the California Fruit News. Data for 1919–1927 compiled from annual California Crop Reports. There are some indications,

(Continued from page 19)

not altogether conclusive, that estimates for a decade or more previous to 1923 are too low as compared with the estimates for 1923–1927.

Col. 4.—Sum of items for corresponding years in cols. 2 and 3.

Col. 5.—Data for 1898–1908 based on very rough estimates of Bosnian and Serbian exports of dried prunes by crop years, as reported in scattered news items in the California Fruit Grower (now California Fruit News), and upon official data of calendar-year exports of Serbia, and of Austria-Hungary exports, imports, movements through the country from Serbia to other countries, and movement between Austria and Hungary. See footnote 23, page 21, for the pre-war prune-producing areas now included in Jugoslavia. Data for 1909–1913 are the sum of Serbian exports by calendar years from official sources and of Bosnian exports from unofficial sources as reported by the Royal Inspector of Agriculture, Tuzla, Bosnia. Data for 1920–1928 are for approximate crop years and are based on official Jugoslavian export statistics, supplied, as were 1909–1912 data also, by the Division of Historical and Statistical Research, U. S. Bureau of Agricultural Economics. See footnote 22, page 21, for reasons why Jugoslavian exports are used instead of production estimates.

Col. 6.—Data for 1898–1903 are rough trade estimates compiled from the California Fruit Grower. Years 1904–1923, official estimates from Agricole Statistique, compiled by Lucien Memminger, American Consul at Bordeaux, France, and published in California Fruit News, April 17, 1926, *p. 4.* Years 1924–1927 compiled from mimeographed releases enumerated as sources for col. 5. Conversion factor, 1 metric quintal equals 220.46 pounds, or 0.11023 short tons.

Col. 7.—Total of the countries included in this table. A few thousand tons not included in this total are produced elsewhere. See page 23.

PRODUCTION IN FOREIGN COUNTRIES[21]

Relative Importance.—Nearly one-fourth of the average world commercial[22] crop of about 230,000 tons of prunes has been produced outside of the United States in recent years (see figures 5 and 6, and table 2). The southern European country of Jugoslavia, the principal competitor of the United States in international trade in prunes, now contributes an average of nearly 20 per cent of world commercial production. France, the only other important country producing and exporting prunes on a commercial scale, has averaged only about 5 per cent, while California accounted for about 66 per cent, during the five years 1923–1927. The output of the Pacific Northwest now averages about 12 per cent of the world total and approximately 15 per cent of our national total.

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[21] The status of, and the outlook for production and international trade in dried prunes in the chief prune-producing countries of the world is discussed in moderate detail in: Wheeler, L. A. International trade in dried fruit. U. S. Dept. Com., Bur. For. and Dom. Com. Trade Promotion Series Bul. 44:40–55. 1927. The same information is briefly summarized by Wheeler in Critchfield, B. H. Demand, marketing, and production of Oregon and Washington prunes. U. S. Dept. Agr. Cir. 416:23–25, 34–40. 1927. The authors of both of these bulletins based much of their discussion of the French prune industry upon an unpublished report (about 70 typewritten pages) from Consul Lucien Memminger, Bordeaux, November, 1925; and much of the discussion of the

[22] See page 21.

Jugoslavia.—The limited available statistics on Jugoslavian dried-prune production[23] indicate that the average crop since the war has been about 70,000 tons, or approximately 30 per cent of world production (including Jugoslavian domestic consumption) and slightly over 50 per cent as much as that of California. Post-war world commercial production (excluding Jugoslavian domestic consumption) has been appreciably greater than the average for the five years 1909–1913 (see figure 5). Indications are that post-war exports of Jugoslavian prunes have been approximately one-third greater than during the period 1909–1913 immediately preceding the war, but about 40 per cent less than during the five years 1904–1908 (see table 2).

Jugoslavian industry upon mimeographed releases of reports from Consul K. S. Patton, Belgrade, and from Edwin Smith, fruit specialist of the U. S. Bureau of Agricultural Economics in Europe. These reports and current information bringing them up to date are found in the U. S. Bureau of Foreign and Domestic Commerce mimeographed weekly news release, Foodstuffs 'Round the World—Canned and Dried Fruits section; and in the U. S. Bureau of Agricultural Economics mimeographed releases on Foreign News on Prunes issued frequently at irregular intervals beginning August, 1925. The Division of Markets of the California Department of Agriculture is now issuing mimeographed releases on the current production and marketing situation of dried prunes which includes much of the more important information on prunes that is issued in the two series of federal releases noted above.

[22] World commercial dried-prune production as used throughout this bulletin refers to the data in table 2, which include the exported portion of Jugoslavian production but not that consumed at home. Export data have been used instead of estimates of dried-prune production because they are of considerably more value, for many purposes, than' the dried production estimates available for years since the war, being more accurate and of greater commercial significance. Moreover, the available data before the war are estimates of exported or exportable surplus rather than of dried-prune production. The domestic consumption of Jugoslavian dried-prunes probably varies but little and hence the proportion of the dried-prune crop exported varies relatively more widely than production.

The unofficial estimates of Jugoslavian total dried-prune production since the war are very rough approximations only, based on the probable utilization of the plum crop, 40 per cent being considered as about the normal proportion of the total plum crop dried. These estimates of the American Consul, K. S. Patton, at Belgrade (compiled from mimeographed releases of U. S. Bureau of Agricultural Economics, Foreign News on Prunes, and U. S. Bureau of Foreign and Domestic Commerce, Foodstuffs 'Round the World: Canned and Dried Fruits) in thousands of tons are 1920, 66.4; 1921, 80.3; 1922, 83.6; 1923, 85.8; 1924, 28.8; 1925, 80.8; 1926, 83.0; 1927, not available.

[23] Before the war the prune-producing areas of the present Kingdom of the Serbs, Croats, and Slovenes—popularly known as Jugoslavia—were chiefly those of Bosnia and of Northern Serbia. So-called Bosnian prunes include a considerable output from Herzegovina, just south of Bosnia, and Croatia to the north, as well as from Bosnia proper. Before the war these provinces were all included in the Austrian Empire, while the Serbian prune-producing area was in Serbia proper. Since the war the Serbian prune-producing area has apparently accounted for roughly about two-thirds of the Jugoslavian dried-prune output, the remainder coming largely from the Bosnian area (including Herzegovina and Croatia).

Since the war the relative fluctuations from year to year in Jugoslavian production, and particularly in the exportable surplus of dried prunes, have been much greater than for California prunes but much less than for the French crop. These upsetting variations are accounted for by great changes in yield per acre and in the amount of the plum crop utilized for drying and particularly for exporting. In spite of the commercial importance of the exports of dried prunes from Jugoslavia, plum-growing was originally, and still is, secondary to the production of grain. The drying of prunes for export is, moreover, of secondary importance to the making of plum brandy for domestic use. The consumption of plums at home makes it very difficult to forecast accurately the probable exportable surplus of dried prunes for any one year and hence, in some years, introduces a large element of uncertainty in the potential demand for California prunes in European markets.

Those best informed regarding the outlook for dried-prune production in Jugoslavia during the next decade or more believe that prunes from there will probably continue to offer as much competition to our prunes in European markets, on the average, as in recent years, and that possibly the competition from this source may increase. Large plantings of seedlings since the war are the strongest indication of the possibility of increasing plum production in the future, but these are said to be largely of a variety producing plums better suited for brandy-making than for drying. The government is trying to encourage the prune industry by subsidizing plum-tree nurseries and by regulations designed to improve the method of drying and preparing prunes for market. On the other hand recent reports indicate that possibly insect and fungous pests may be injuring the prune orchards somewhat more than in the past. There has been no noticeable upward trend in either dried-prune production or exports since 1920. Upon the basis of the limited facts available one cannot forecast the trend of either with any assurance. Because of the commercial importance of the Jugoslavian dried-prune industry we need more and better information regarding its significant developments.

France.—The average production of prunes in France since the war has been very small and has, moreover, fluctuated violently from year to year (see fig. 6). The post-war average of less than 11,000 tons is only about one-half the 1909–1913 average and less than one-fourth of that for 1904–1908 (see table 2). Since the war the output has ranged from as high as 30,000 tons to as low as about 2,000. These violent fluctuations in output result in decided variations in French

foreign trade in prunes since France is on an export basis in years of large prune crops, but on an import basis whenever the crop is small. As prune production in France is apparently not tending to increase, it seems unlikely that California prunes will meet any greater competition from this source in the near future than in recent years. Great fluctuations in the size of the crops, however, may be expected as in the past.
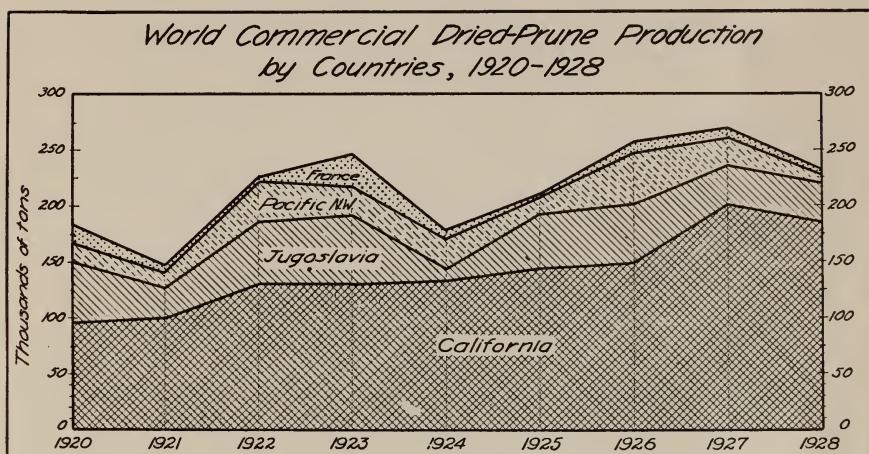
Fig. 6.—Largely because of increased production in California, which produces two-thirds of the world commercial production of prunes, there has been an upward trend in the world output of prunes since 1920. Fluctuations in California, and hence in world, production have been relatively small compared with variations in the output of Jugoslavia, France, and the Pacific Northwest. (Data from table 2.)

Other Countries.[24]—Although dried-prune production has never been of commercial importance in any foreign countries besides France and Jugoslavia, there are a number of countries in which there are possibilities of future development. Roumania, Australia, South Africa, and Persia all produce small quantities of dried prunes, substantially all of which are consumed at home. In the first three of these countries, however, the dried-prune industry might be developed on a commercial scale. Roumania, the agriculture of which is in many ways similar to that of Jugoslavia, already produces large quantities of plums suitable for drying, but most of these are eaten in

[24] In 1923 Australia produced 584 short tons of dried prunes. The Union of South Africa has averaged less than 1,000 tons in recent years, and Persia approximately 1,000 tons. See: Wheeler, L. A. International trade in dried fruit. U. S. Dept. Commerce, Bur. For. and Dom. Commerce, Trade Promotion Series Bul. 44:52–53. 1927. Roumania sometimes dries as many as 4,000 or 5,000 tons of prunes of very small sizes.

the fresh state or made into brandy and jam.   The possibilities of future competition from Australian and South African prunes are significant because of the adaptability of large areas in these countries to plum growing, together with the fact that, as British countries, their largest export market would most likely be the United Kingdom, which is now second only to Germany as a foreign market for California prunes.

TABLE 3

AVERAGE DRIED-PRUNE EXPORTS FROM CHIEF PRODUCING REGIONS TO PRINCIPAL MARKETS, 1923–1927

Principal markets	Producing regions					
	Average 1923–1927				Average 1923–26	Total
	*Oregon and Washington	California	United States	Jugo-slavia	France	
	Thousands of pounds i.e., 000 omitted					
	1	2	3	4	5	6
Germany	6,986	35,341	42,327	27,100	645	70,072
United Kingdom	7,223	27,290	34,513	1,591	2,726	38,830
France	437	21,603	22,040	2,262		24,302
Netherlands	138	12,282	12,420	1,078	796	14,294
Belgium	809	4,373	5,182	233	465	5,880
Scandinavia	1,395	12,621	14,016	758	†	14,774
Canada	*	17,301	17,301	†	†	17,301
Others	2,052	12,980	15,032	55,269‡	4,994	75,295
Total	19,040*	143,791	162,831	88,291	9,636	269,758
Percentage of grand total	7.3	55.1	62.4	33.9	3.7	100.0
	Per cent of total of each producing region					
Germany	36.7	24.6	26.0	30.7	6.7	26.9
United Kingdom	37.9	19.0	21.2	1.8	28.3	14.9
France	2.3	15.0	13.5	2.6		9.3
Netherlands	0.7	8.5	7.6	1.2	8.3	5.5
Belgium	4.3	3.0	3.3	0.2	4.8	2.3
Scandinavia	7.3	8.9	8.6	0.9	†	5.7
Canada	*	12.0	10.6	†	†	6.6
Others	10.8	9.0	9.2	62.6	51.9‡	28.8
Total	100.0	100.0	100.0	100.0	100.0	100.0

* These data for Oregon and Washington do not account for the total exports of northwestern prunes as they are *overseas* exports direct from the Oregon customs district only.

† Data not available for these countries individually and hence are included in "others."

‡ Most Jugoslavian prune exports go to central and southern European countries. During the period 1923–1927 Italy took 21.3 per cent, Austria 15.8, Czechoslovakia 13.4, Hungary 5.0, and Switzerland 4.2 per cent.

Sources of data:

Date are all for calendar years.

Col. 1.—Compiled from official data of the U. S. Bureau Foreign and Domestic Commerce for this district. Data are not available on exports of Oregon and Washington prunes to Canada nor by rail and water to oversea countries via

other U. S. customs districts. Indirect exports overseas, however, are believed to be relatively small.

Col. 2.—California exports are computed by subtracting Oregon and Washington exports from United States exports and hence indicated California exports to Canada include an unknown amount of exports of northwestern prunes.

Col. 3.—Compiled from U. S. Bur. For. Dom. Commerce, Foreign Commerce and Navigation of the United States.

Cols. 4 and 5.—Compiled from official Jugoslavian and French data from: Wheeler, L. A. International trade in dried fruit, U. S. Bur. For. Dom., Commerce Trade Promotion Series Bul. 44:47, 52. 1927; and from Foodstuffs 'Round the World: Canned and Dried Fruit.

INTERNATIONAL TRADE

Relative Importance of Exporting Countries.—An average of over one-half of the estimated world production (total of commercial and non-commercial) of dried prunes has entered into international trade during the last five years, and the proportion of world exports which has originated in each producing region has corresponded roughly
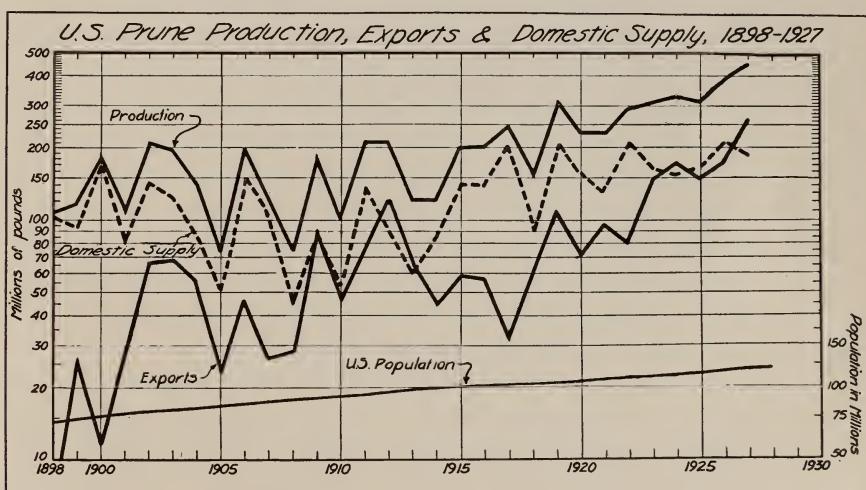
Fig. 7.—United States production, consumption, and exports of prunes have all increased much more rapidly than population during the last twenty years. (Data from table 5, page 31.)

to the percentage of the world dried-prune crop which each has produced. Of the average annual world export of dried prunes of over 260 million pounds in recent years, the United States has exported over 62 per cent. California alone has contributed approximately 55 per cent, Jugoslavia nearly 34 per cent, the Pacific Northwest slightly over 7 per cent, and France less than 4 per cent (table 3).

Trend and Fluctuations in United States Exports.—The trend in exports of prunes from the United States has been rapidly upward during the last thirty years, with the exception of the period during

the war (see fig. 7). The rapid increase in the importance of foreign markets is shown by the fact that in the period 1899–1903 about 25 per cent of average national production of approximately 162 million pounds was exported, compared with 48 per cent of an average of 165 million pounds in the period 1909–1913. During the five years 1922–1926, 44 per cent of an average of about 328 million pounds has been exported.

A study of figure 7 shows that in the past there have been relatively[25] violent fluctuations from year to year in the quantity of prunes exported. Since the war, however, these variations have been smaller than in pre-war days. Fluctuations in California production and Jugoslavian exports account for much of the variation in our annual exports. The percentage of our production exported has not varied nearly as much as the actual quantity exported.

Relative fluctuations in our exports to important individual countries (see table 14, page 68) have been the smallest for Canada, largely because of its proximity to the United States and its distance from European producing areas. Exports to the United Kingdom have varied considerably more than have those to Canada but much less than those to Germany. Most of the violent fluctuations in German imports from this country seem to be largely the result of changes in the quantities imported from Jugoslavia and the latter, in turn, are largely due to changes in Jugoslavian production and total exportable surplus. During the last five years Germany has received about 60 per cent of her imports from the United States, whereas the United Kingdom has taken nearly 90 per cent of hers from us.

Competition in Chief Foreign Markets.—The people of Western Europe are the greatest consumers of dried prunes. They have imported nearly 95 per cent of world exports in recent years and

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[25] *Significance of Semi-Logarithmic or Ratio Charts.*—In picturing statistical data one frequently wishes to emphasize comparisons of percentage or proportional changes rather than absolute amounts. For the purpose of showing such relative changes a ratio scale, such as the vertical scale in figure 7, is most useful. Equal vertical distances on the semi-logarithmic paper on which the figure is plotted picture equal percentages (rates) of change. For convenience in plotting and reading, however, the scale has been numbered in millions of pounds. With the usual or arithmetic scale on ordinary cross-section paper, such as was used in figure 4, page 16, the distance between the vertical lines 20 and 40 is pictured as twice as great as the distance from 10 to 20. In figure 7, however, the vertical distance from 20 to 40 is just equal to the distance from 10 to 20, for the reason that 20 bears the same ratio to 40 that 10 does to 20. It is obvious that 20 is twice as great as 10; in other words, 20 is 100 per cent greater than 10. Likewise, 40 is twice as great as 20, or, in other words, 40 is 100 per cent greater. Equal distances on the scale correspond to equal relative or percentage changes, and not, as in figure 4, to equal absolute differences. Equal percentage increases over a series of years, when plotted on semi-logarithmic paper, are represented by a straight line.

nearly 90 per cent of our own exports, Canada being the only important importer of United States prunes aside from countries in Western Europe (See table 3). Germany imports far more prunes than any other country and is the most important foreign outlet for both Jugoslavian and United States prunes. During the last five years nearly 27 per cent of world exports went to Germany, over 30 per cent of Jugoslavian exports going there and about 25 per cent of our own. The United Kingdom, the next most important prune importer, took practically 15 per cent of Jugoslavian exports during this period and over 20 per cent of those from the United States. The United Kingdom is the leading market for exports from France. France ranks third in the tonnage of prunes imported from the United States and also from the world. As a foreign market for California prunes Canada ranks fourth, following France in importance. The Netherlands have averaged fifth, Scandinavia (Sweden, Denmark, and Norway as a group) sixth, and Belgium seventh during the last five years.

Jugoslavian Competition in Germany.—Partly because of the relatively lower prices at which Jugoslavian prunes are usually sold, they ordinarily find preference over ours in German markets. Our exports to Germany, therefore, vary almost inversely with Jugoslavian production and exports to Germany. In six of the last eight years Germany has secured a larger percentage of her total imports of dried prunes from Jugoslavia than from the United States. On the average, however, less than 40 per cent of total German prune imports during the last five years (1923–1927) were obtained from Jugoslavia and 60 per cent from the United States (see table 3). Very small Jugoslavian production and exports in the crop years 1924 and 1927 plus unusually heavy California production and exports in 1927 accounts for this situation. Nearly one-fifth of Jugoslavian prune exports have gone to Czechoslovakia during the last four years. There has been a decided tendency for both the quantity and the proportion of Jugoslavian exports to Czechoslovakia to increase since 1920, while there has apparently been a slight tendency for the proportion exported to Germany to decline. If these tendencies should continue, the result may be an increase in German imports of our prunes.[26]

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[26] The recent reduction in the German tariff on prunes, which became effective December 20, 1927, should benefit the American industry. The import duty on unpacked prunes in sacks or barrels of at least 176 pounds is reduced from $1.08 per hundred pounds to $0.65, and that on prunes otherwise packed from $2.16 to $0.86. The reduction on ''prunes otherwise packed'' should stimulate exports of packed prunes, since the high duty heretofore prevailing made it necessary to ship most of the prunes destined for Germany in bulk. See California Fruit News. Jan. 7, 1928, *p. 3.*

Chief Markets for Jugoslavian Prunes.—Most Jugoslavian prune exports go to those European countries which, with the exception of Germany, import very few prunes from the United States. These countries, however, re-export a considerable part of their Jugoslavian prune imports to other European markets such as the Scandinavian countries and Poland. Germany, the most important market for Jugoslavian prunes, has taken over 30 per cent of those exported in recent years. In addition, nearly 60 per cent have been exported to five neighboring countries, Italy taking approximately 21 per cent, Austria 16, Czechoslovakia 13, Hungary 5, and Switzerland 4 per cent. Jugoslavian export trade is largely confined to neighboring European countries chiefly because of the interior position of the country and the large demand for cheap prunes in central and northwestern Europe.

French Foreign Trade.—France is the only prune-producing country of any importance which imports as well as exports dried prunes. Since the war, imports, which come from California chiefly, have averaged about three times the exports. The prunes imported by the French are largely consumed at home and are in general of a lower quality than the superior pack which is exported. During the last two decades French exports of prunes have declined even more rapidly than production. The production of prunes in France since the war has averaged only about one-half of the 1909–1913 average (see table 2), whereas exports are only slightly more than one-third of the pre-war figure.[27]

The United Kingdom has long been the chief market for prunes exported from France, nearly one-third going to this country since the war. Argentina, Germany, and the Netherlands are next in importance, each taking slightly over 10 per cent. The proportion taken by Germany has decreased greatly since pre-war days and that of the Netherlands has remained about the same. The proportion taken by Argentina, about 10 per cent of French exports, shows a noticeable increase, although the absolute quantity, an average of about two million pounds, is still small.

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[27] To try to encourage domestic production of prunes, France recently greatly increased the protective tariff on prunes imported from other countries. It is difficult to estimate the effect of the new rates upon our exports to France, Consul Lucien Memminger at Bordeaux reports. ''The new rates, which went into effect on March 16, provide for a duty of 80 francs per 100 kilos ($1.427 per 100 pounds) for all prunes of whatever size packed in cases or boxes. For prunes otherwise packed (usually undipped prunes in sacks) the new rates are: 80 franc per 100 kilos, ($1.427 per 100 pounds) for prunes counting 80 or less per 500 grams, and 60 francs per 100 kilos ($1.07 per 100 pounds) for prunes counting more than 80 per 500 grams. These are the so-called minimum rates

GENERAL FRUIT SITUATION

Any successful campaign to increase the demand for prunes must take into consideration the plentiful and low-priced supplies of dried fruits other than prunes that are available to consumers. The majority of prune eaters are apparently persons with medium and small incomes. They are more price sensitive than the well-to-do and are inclined to watch prices and to eat more of the cheaper kinds of fresh, canned, and dried fruits than of the expensive kinds. When there are many fruits available at low prices, as has been the case in recent years and may be so for several years, competition between them for a larger place in the consumer's diet is very keen. The limited capacity of the consumer's stomach means that if he eats more of one fruit he will probably eat correspondingly less of others, unless he reduces his consumption of some other kinds of foods, such as vegetables, cereals, or meats.

National production of many fruits, several of which compete with prunes, to some extent at least, has increased rapidly in the last decade, making it difficult to market many fruits at satisfactory prices in years when weather conditions have been favorable for good yields of fruit in general. Analysis of available California data points to the conclusion that large increases in the total fruit production of the state usually result in low prices to growers.[28] The California output of dried fruits has more than doubled since the pre-war period, 1910–1914 (see table 4), and will probably continue to expand until 1930, at least. During the same period the national canned-fruit pack, including Hawaiian pineapples, has multiplied by three and promises to grow still further.[29] The national output of fruits which

which apply to imports from the United States as well as to imports from Jugoslavia, the other principal source of French imports. The general tariff is double these minimum rates. The minimum rates represent an increase over the old rate, which was 20.40 francs per 100 kilos ($0.364 per 100 pounds), of about 400 per cent for all prunes packed in cases and for unpacked prunes counting 80 or less per 500 grams, and of about 300 per cent for unpacked prunes counting more than 80 per 500 grams. (U. S. Bur. Agr. Econ. Foreign News on Prunes. F. S. P-51 (mimeo.). April 12, 1928.)

This article also discusses the relation of the new duty to American prune sizes and the effect of new rates on imports of American prunes at Bordeaux.

[28] Shear, S. W., and H. F. Gould. Economic status of the grape industry. California Agr. Exp. Sta. Bul. 429:96. 1927.

[29] In connection with a discussion of the canning-pear situation the author presented a brief statement of the trend of canned-fruit production in the United States, Hawaii, Australia, and the Union of South Africa in: Shear, S. W. Economic aspects of the pear industry. California Agr. Exp. Sta. Bul. 452:84–87, 94–97. 1928.

are consumed in fresh form, such as oranges, grapes, peaches, pears, and cantaloupes, has likewise grown rapidly since pre-war days. Apparently there will be no abatement for several years in the keen competition which prunes will normally meet from the plentiful and low-priced fruit which will probably be placed upon the market.[30]

TABLE 4

CALIFORNIA DRIED-FRUIT PRODUCTION, AVERAGE 1910–1914 AND 1923–1927

	Average, 1910–1914		Average, 1923–1927		Change from 1910–1914 to 1923–1927		Percentage change from 1910–1914 to 1923–1927
	Tons	Per cent	Tons	Per cent	Tons	Per cent	
Raisins	75,900	38.9	249,000	53.1	+173,100	+63.5	+228.1
Prunes	68,300	34.9	153,600	32.8	+ 85,300	+31.2	+125.0
Peaches	25,800	13.2	22,420	4.8	− 3,380	− 1.2	− 13.0
Apricots	15,450	7.9	21,560	4.6	+ 6,110	+ 2.2	+ 39.2
Figs	5,155	2.6	10,190	2.2	+ 5,035	+ 1.8	+ 97.8
Apples	3,300	1.7	8,400	1.8	+ 5,100	+ 1.9	+154.7
Pears	1,550	0.8	3,270	0.7	+ 1,720	+ 0.6	+111.0
Total	195,455	100.0	468,440	100.0	+272,985	100.0	+139.2

Sources of data:

Data for 1910–1914 for: raisins: Shear, S. W., and H. F., Gould. Economic status of the grape industry. California Agr. Exp. Sta. Bul. 429:124. 1927. For prunes: table 2, page 19. For pears: Shear, S. W. Economic aspects of the pear industry. California Agr. Exp. Sta. Bul. 452:102. 1928.

Data for all other fruits, 1910–1914, and for all fruits, 1923–1927, from: Kaufman, E. E. California crop report for 1927. California State Dept. Agr. Spec. Pub. 86:35. 1928.

CONSUMPTION OF DRIED FRUITS

Domestic Consumption of Prunes.—United States consumption of dried prunes has increased since the decade before the war from about 1.0 pounds per capita to 1.6 pounds during the five years 1921–1925 (see figure 8). With the prospects of heavy production in this country during the next few years and no decrease in foreign production and exports, our domestic consumption of prunes will continue to be large, unless something very unexpected happens. The outlook for large average crops of prunes and of many other dried fruits and fresh and canned fruits, indicates that the level of fruit prices prevailing during the next few years is likely to be low.

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[30] Those who wish to study the changes which have taken place in the supply, price, and utilization of our more important fruits during the last two decades should consult the economic bulletins which have been issued by the College of Agriculture at Berkeley during the past three years. They include studies of the following fruits: peaches, cantaloupes, apricots, grapes, watermelons, pears, oranges, lemons, grapefruit, and plums.

TABLE 5

UNITED STATES PRODUCTION, EXPORTS, AND DOMESTIC SUPPLY OF DRIED PRUNES, CROP YEARS 1898–1927

Year beginning Sept. 1	U.S. production, million pounds	Exports, million pounds	Domestic supply — Total, million pounds	Domestic supply — Per capita pounds	U.S. population, millions	Percentage of production — Domestic supply, per cent	Percentage of production — Exports, per cent	Domestic supply from California — Million pounds	Domestic supply from California — Per cent of U.S. domestic supply	Domestic supply from California — Per cent of California production
	1	2	3	4	5	6	7	8	9	10
1898	107.4	5.7	101.7	1.4	72.9	95	5	85	83	94
1899	117.2	26.1	91.1	1.2	74.3	78	22	62	68	54
1900	184.0	11.5	172.5	2.3	76.0	94	6	163	94	94
1901	105.6	26.5	79.1	1.0	77.6	75	25	56	70	69
1902	210.0	66.5	143.5	1.8	79.2	68	32	131	91	67
1903	195.0	69.4	125.6	1.6	80.8	64	36	96	76	58
1904	143.0	56.0	87.0	1.0	82.5	61	39	81	93	60
1905	73.5	22.9	50.6	0.6	84.1	69	31	40	79	64
1906	200.0	46.8	153.2	1.8	85.7	77	23	139	90	75
1907	130.0	26.3	103.7	1.2	87.3	80	20	80	77	76
1908	73.0	28.0	45.0	0.5	88.9	62	38	9	20	16
1909	180.0	87.4	92.6	1.0	90.5	51	49	63	68	42
1910	100.0	46.7	53.3	0.6	92.4	53	47	33	61	41
1911	214.0	77.2	136.8	1.5	93.8	64	36	114	83	60
1912	213.0	121.6	91.4	1.0	95.2	43	57	83	90	41
1913	124.0	64.3	59.7	0.6	97.1	48	52	32	53	33
1914	122.5	44.0	78.5	0.8	99.0	64	36	73	93	65
1915	203.5	58.6	144.9	1.4	100.4	71	29	99	68	63
1916	199.5	57.7	141.8	1.4	101.8	71	29	127	89	85
1917	241.0	31.8	209.2	2.0	103.2	87	13	186	88	31
1918	151.0	62.3	88.7	0.8	104.4	59	41	28	31	63
1919	315.0	109.9	205.1	2.0	105.0	65	35	170	82	63
1920	230.0	72.5	157.5	1.5	106.4	68	32	124	78	64
1921	226.5	95.3	131.2	1.2	108.4	58	42	106	80	53
1922	292.0	131.2	160.7	1.5	109.7	55	45	152	94	69
1923	310.0	147.3	162.7	1.5	111.5	52	48	123	75	47
1924	328.0	171.9	156.1	1.4	113.4	48	52	120	76	43
1925	318.0	149.4	168.6	1.5	115.0	53	47	146	86	43
1926	390.0	173.4	216.6	1.9	117.1	56	44	176	81	50
1927	452.0	265.0	187.0	1.6	118.6	41	59	159	85	59
1928	327.6									
AVERAGES										
1899–03	162.4	40.0	122.4	1.6	77.6	75.4	24.6	101.6	62.6	......
1904–08	123.3	36.0	87.9	1.0	85.7	71.3	29.2	69.8	56.6	......
1909–13	165.2	79.4	86.8	0.9	93.8	52.5	48.1	65.0	39.3	......
1922–26	327.6	144.5	183.1	1.6	113.3	55.9	44.1	143.4	43.8	......

Sources of data:

Col. 1.—Data from table 2, page 19, converted from tons.

Col. 2.—Data for crop years beginning September 1 compiled from monthly data from U. S. Dept. Commerce, Monthly Summary of Foreign Commerce.

Col. 3.—U. S. production (col. 1) minus U. S. exports (col. 2). No allowance has been made for carryover in this table although very rough estimates of carryover have been taken into consideration in plotting figure 1, page 10.

Col. 4.—Data in col. 3 divided by population for corresponding year in col. 5.

Col. 5.—Data on population are estimates for July 1 each year, based on the United States Census. Compiled from Statistical Abstracts of the U. S. Dept. Commerce.

Col. 8.—Data in col. 3 minus Pacific Northwest production given in table 2, page 19, for years 1898–1919 and, for years 1920–1927, minus estimates of approximate United States consumption of northwestern prunes from: Critchfield, B. H. Demand, marketing, and production of Oregon and Washington prunes. U. S. Dept. Agr. Dept. Cir. 416:20. 1927.

Col. 10.—Based on col. 8 and California production as given in table 2, page 19.

Present consumption is the same as the average of the years 1899–1903, during which period California and total world production was larger than the average of the following decade and exports were taking only about 25 per cent of our production out of the domestic market (see table 5). Prune prices for several years after 1900 were, as during recent years, very low and carryovers frequent. From 1902 to 1910 the trend of California production and of United States consumption was downward (see figures 7, page 25, and 13, page 48). Consumption declined more rapidly than production, however, as a result of the expansion of our export trade in dried prunes, which was stimulated by the rapid decline in production and exports of European commercial prune-producing areas. Our export trade during the period 1909–1913 accounted for 48 per cent of our national production, a larger percentage than the average of recent years. In spite of the noticeable pre-war increase in our production which began about 1909, exports were heavy enough in the years 1909–1913 to reduce our per-capita consumption to about 0.9 pound, the lowest five-year average for thirty years. The increased volume of our exports, however, was largely due to the increased demand for our prunes resulting from the smallest European production of prunes during the period 1909–1913 of any five years in the last three decades (see figure 5, page 18). There is little likelihood that European production will average much lower for some time than it has during the last four or five years. We cannot, therefore, expect any great expansion of foreign demand for our prunes on the average during the next few years on this score alone.

Foreign Consumption of Prunes.—Both the total and the per-capita consumption of dried prunes has substantially increased in nearly all of the chief prune-consuming countries since pre-war years. Comparison of averages for the pre-war years 1909–1913 and for the post-war years 1921–1925 as shown in table 6, and figure 8, show these increases clearly and also the relative importance of these markets. (See also table 3, page 24.) Germany is the only important prune-producing country whose total consumption of prunes has averaged lower in recent years than before the war. In two years since the war, however, German dried-prune imports (net) have been larger than the pre-war average, and it seems probable that lower average post-war consumption is largely due to temporary reduction in the purchasing power of the Germans, who, in the past, have normally been one of the best markets for prunes.

TABLE 6

Dried-Prune Consumption by Chief Countries, Averages 1909–1913 and
1921–1925

Countries	Total consumption			Per capita consumption		
	1909–13 average, thousands of pounds	1921–25 average, thousands of pounds	Per cent change	1909–13 average, pounds	1921–25 average, pounds	Per cent change
United States	86,800	177,000	+104	0.9	1.6	+ 78
Germany	70,290	63,000	− 10	1.1	1.0	− 5
United Kingdom	20,357	41,277	+103	0.5	0.9	+ 96
France	28,347	38,478	+ 36	0.7	1.0	+ 43
Poland		15,800			0.6	
Canada	10,386	14,325	+ 38	1.2	1.6	+ 38
Netherlands	4,221	13,018	+203	0.7	1.8	+157
Denmark	5,039	10,035	+ 99	1.8	3.1	+ 73
Sweden	4,859	5,933	+ 22	0.9	1.0	+ 18
Switzerland	3,821	5,778	+ 51	1.0	1.5	+ 43
Norway	3,314	5,958	+ 80	1.4	2.3	+ 66
Belgium	4,780	4,973	+ 4	0.6	0.6	0
Finland	2,408	3,722	+ 55	0.8	1.1	+ 41
New Zealand	900	1,384	+ 54	0.9	0.9	0
Argentina	1,244	1,693	+ 36	1.7	1.9	+ 15

Source of data:

Data are approximate net imports by calendar years compiled from: Wheeler,
L. A. International Trade in Dried Fruit. U. S. Dept. Com. Bur. For. and
Dom. Com. Trade Promotion Series 44:52–55, 97–113; 1927; with the exceptions
noted below.

United States and France.—Domestic production consumed at home by crop
years taken into consideration. (See table 2, page 19, and 5, page 31.) United
States export and production data are for crop years, while those for France
are a combination of calendar year exports and imports and production by
crop years.

Germany.—As import data list prunes separately but export data include
them in all dried fruits, net imports are estimates based on the assumption
that dried-fruit exports are largely prunes; 3 million of the 3,145,000 pounds
of dried-fruit exports were subtracted from average prune imports, calendar
years 1909–1913, and 7 million out of an average of about 7,300,000 pounds
for the crop years 1923–1927.

Poland.—Imports for calendar years 1924–1927.

Norway.—The only available import data, as given, include dates together
with prunes. Dates, however, probably constitute a very small part of the
total as they are considered a luxury in Scandinavian countries and are not
consumed in large quantities. Of the total of prune and date imports (which
are given separately for Denmark and Sweden) an average of about 83 per cent
were prunes in Denmark and about 97 per cent in Sweden during both the
pre-war and the post-war periods included in this table.

New Zealand.—Data for 1909–1913 are estimates based upon exports from
United States to that country.

Figure 8 and table 6 show that the people of northwestern Europe consume more prunes per capita than any other equally large and well-populated area in the world. Many of these countries now consume a pound or more of dried prunes per capita annually and nearly all of them have shown a decided increase in per-capita consumption since pre-war days.
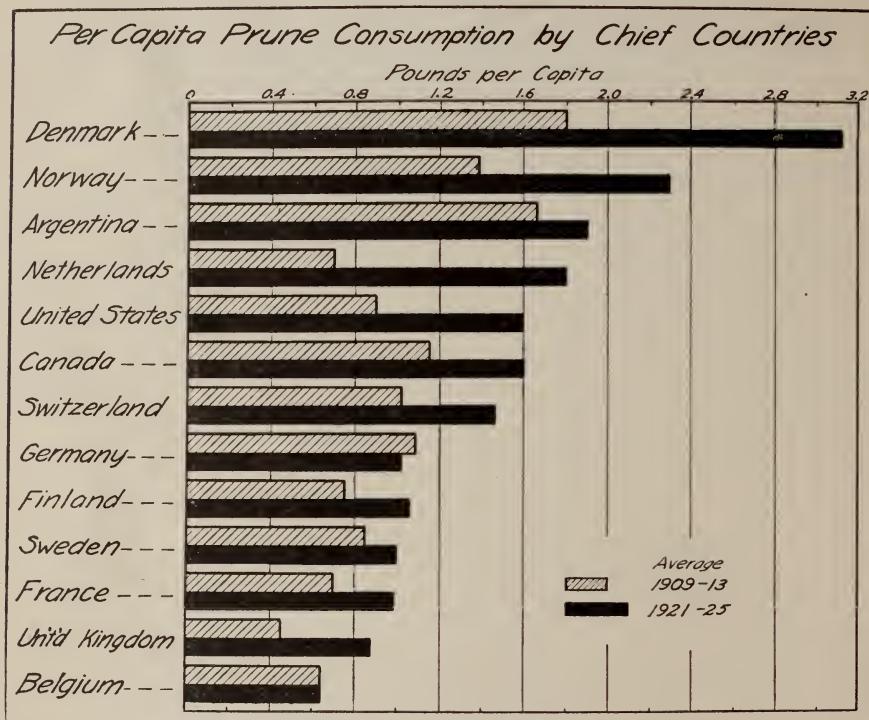

Fig. 8.—The people of northwestern Europe consume more dried prunes per capita than the people of any other important markets except the United States and Canada. (Data from table 6.)

Argentina, the United States, Canada, and New Zealand are the only other important prune-consuming countries listed whose per-capita consumption is as large as that of most of these European countries. The population of two of these countries—Argentina and New Zealand—is, unfortunately, too small to make them markets for large quantities of prunes at the present time.

Relative Importance of Prunes.—About 25 per cent of the dried fruit consumed in the United States in recent years has been prunes, nearly 50 per cent in Denmark, approximately 45 per cent in Germany, about 20 per cent in the Netherlands, Canada, and Belgium, and only 11 per cent in the United Kingdom. Before the war (1909–

1913) prunes averaged about 21 per cent of the dried fruit consumed in the United States. In Canada, and in all important European markets but the United Kingdom, Belgium, and the Netherlands, they constituted a higher percentage than the present one. In most of the other important European markets, such as Germany, Denmark, Sweden, Norway, and Switzerland, prunes constituted approximately 35 to 40 per cent of the total of all dried fruits consumed in pre-war years.

TABLE 7

Dried Fruits: United States Production, Foreign Trade, and Consumption, Average 1921–1925

Kind of fruit	Production		Exports		Imports		Consumption		
	Tons	Per cent	Tons	Per cent	Tons	Per cent	Tons	Per cent	Pounds per capita
Raisins	211,700	48.4	42,283	31.0	5,944	8.9	175,361	47.8	3.2
Currants					13,010	19.4	13,010	3.5	0.2
Prunes	152,150	34.9	63,865	46.8			88,285	24.1	1.6
Figs	9,635	2.2			19,489	29.1	29,124	7.9	0.5
Dates	500	0.1			28,619	42.6	29,119	7.9	0.5
Peaches	23,140	5.3	3,428	2.5			19,712	5.4	0.4
Apricots	18,300	4.2	10,222	7.5			8,078	2.2	0.1
Apples	15,000*	3.5	10,652	7.8			4,348	1.2	0.1
Other fruits	6,000†	1.4	6,000	4.4					
Total	436,425	100.0	136,450	100.0	67,062	100.0	367,037	100.0	6.7

* Estimated; does not include farm production.   † Includes 3,000 short tons of dried pears.

Source of data:
    Based on: Wheeler, L. A. International trade in dried fruit. U. S. Bur. For. and Dom. Commerce, Trade Promotion Series 44:2. 1927.

Domestic Consumption of Dried Fruits.—Domestic consumption of dried fruits during recent years has averaged 6.7 pounds per capita compared with about 4.3 pounds during the period 1910–1914, an increase of over 50 per cent. Table 7 shows that prunes have constituted nearly 35 per cent of our national production of dried fruits during the period 1921–1925 and that they account for 24 per cent of our consumption of these fruits. Nearly 48 per cent of our consumption of dried fruits has consisted of raisins. Imports swell our consumption of dried fruits other than prunes and raisins to such an extent that we consume a total of these other dried fruits—chiefly figs, dates, and peaches—amounting to about 23 per cent of all dried fruits or approximately the same proportion as prunes. During the years 1910–1914, however, prunes constituted only about 21 per cent of our total dried-fruit consumption, raisins 35 per cent, and all other dried fruits nearly 44 per cent.

TABLE 8

PERCENTAGE OF CALIFORNIA PRUNE PRODUCTION BY SIZES, 1912–1927

Size	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	Average 1912-16	Average 1923-27
20/30	0.3	0.5	0.8	1.2	2.8	1.3	1.7	1.2	1.6	1.5	2.8	1.8	1.8	1.8	2.8	2.5	1.1	2.1
30/40	0.8	2.3	2.8	3.2	7.0	2.5	2.9	3.1	4.5	6.9	9.2	4.7	7.2	6.2	13.4	11.0	3.2	8.5
40/50	5.0	10.5	14.5	13.8	30.2	10.7	9.9	9.5	17.8	22.8	29.3	17.8	23.1	25.5	33.3	26.6	14.8	25.3
50/60	11.2	15.8	25.3	24.8	28.0	18.1	16.3	16.0	22.1	24.0	23.1	23.4	23.4	22.3	21.3	22.6	21.0	22.6
60/70	17.0	17.2	24.3	23.3	15.9	18.9	17.3	16.8	16.9	16.7	14.1	18.4	14.9	16.9	6.9	14.5	19.5	15.4
70/80	17.0	15.0	13.0	12.2	7.2	16.1	15.0	15.9	14.0	11.3	9.7	11.3	12.3	10.5	6.9	9.5	12.9	10.1
80/90	14.8	12.0	8.2	7.8	4.2	8.9	11.3	13.1	9.1	7.0	4.3	8.6	5.1	6.2	3.2	5.0	9.4	5.6
90/100	13.3	9.5	3.8	5.2	2.0	8.9	9.0	9.7	6.1	4.2	3.4	4.6	5.6	3.8	2.2	3.3	6.8	3.9
100/120	12.3	9.9	3.8	4.8	1.5	7.4	9.0	8.8	4.8	3.2	1.7	4.1	4.2	3.2	1.5	2.4	6.5	3.1
120/up	7.5	7.0	2.8	2.8	0.5	4.5	5.1	5.6	2.6	1.8	0.9	2.3	2.0	2.5	0.8	0.9	4.1	1.7
SUB-TOTALS																		
20/40	1.1	2.8	3.6	4.4	9.8	3.9	4.6	4.3	6.1	8.4	12.0	6.5	9.0	8.0	16.2	13.5	4.3	10.6
40/60	16.2	26.3	39.8	38.6	58.2	28.8	26.2	25.5	39.9	46.8	52.4	41.2	46.5	47.8	54.6	49.2	35.8	47.9
20/60	17.3	29.1	43.4	43.0	68.0	32.6	30.8	29.8	46.0	55.2	64.4	47.7	55.5	55.8	70.8	62.7	40.1	58.5
60/90	48.8	44.2	45.5	43.3	27.3	46.3	43.6	45.8	40.0	35.0	28.1	38.3	32.3	33.6	22.2	29.0	41.8	31.1
90/up	33.1	26.4	10.4	12.8	4.0	20.8	23.1	24.1	13.5	9.2	6.0	11.0	11.8	9.5	4.5	6.6	17.3	8.9
60/up	81.9	70.6	55.9	56.1	31.3	67.1	66.7	69.9	53.5	44.2	34.1	49.3	44.1	43.1	26.7	35.6	59.1	40.0
20/50	6.1	13.3	18.1	18.2	40.0	14.5	14.5	13.8	23.9	31.2	41.3	24.3	32.1	33.5	49.5	40.1	19.1	35.9
50/up	93.9	86.7	81.9	81.8	60.0	85.5	85.5	86.2	76.1	68.8	58.7	75.7	67.9	66.5	50.5	59.9	80.9	64.1

Source of data:

Compiled by the California Prune and Apricot Growers Association. Years 1912–1916 from unknown trade sources. Years 1917–1927 based on the Association's total sales.

Data for the last two or three years may not be quite as representative of the total production of the state as data for previous years.

Foreign Consumption of Dried Fruit.[31]   The average per-capita consumption of dried fruits in the United States of 6.7 pounds during the years 1921–1925 was lower than that of the Netherlands (9.1), of Canada (8.1), of the United Kingdom (7.3) and of Switzerland (11.0) and slightly higher than that of Denmark (6.2).   It was, however, considerably higher than the per-capita consumption of any other important dried-fruit consuming country of Europe except Germany. Germany usually consumes between 6 and 7 pounds annually, about 45 per cent of which are prunes.   The average number of pounds of dried fruit consumed per capita in other important European markets during the period 1921–1925 was as follows: Norway, 4.7; Belgium, 3.3; Switzerland, 3.0; Sweden, 2.8; Finland, 2.6; and France, 2.1.

The per-capita consumption of dried fruits in the United States of about 4.3 pounds before the war was lower than that of the Netherlands (8.6), of the United Kingdom (6.6), of Canada (6.3), of Denmark (4.8), and also of New Zealand (11.5).   The principal importing countries whose consumption fell below our pre-war average are Belgium (4.0), Norway (3.4), Germany (3.2), Switzerland (2.5), Sweden (2.3), Finland (2.1), and France (1.9).

SIZE AND QUALITY OF CALIFORNIA PRUNES

Payments based on Size[32] *and Quality.*—For many years trading in California prunes has been based largely upon certain size designations which indicate the number of prunes per pound in the pack in question.   The sizes usually range from 20 to 30 prunes to the pound (called 20/30's) to 120 prunes and more to the pound.   There is a tendency to place all prunes smaller than 100 to the pound in one grade.   Processed California prunes pack out on a standard set by the Dried Fruit Association of California of between 8 and 9 points for domestic trade and between 9 and 10 points for export to foreign countries.   For example, prunes sold to the domestic trade as 40/50's average between 48 and 49 to the pound, while those exported as 40/50's average between 49 and 50 to the pound and 50/60's

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[31] These and other data regarding the consumption of the chief dried fruits in foreign countries may be found in: Wheeler, L. A.   International trade in dried fruit.   U. S. Dept. Com. Trade Promotion Series 44:2 and 97–113. 1927.

[32] A brief discussion of the method of paying growers for prunes on an arbitrary price differential and its relation to pooling practices is given in: Erdman, H. E., and H. R. Wellman.   Some economic problems involved in the pooling of fruit.   California Agr. Exp. Sta. Bul. 432:39–42. 1927.

between 59 and 60.[33] Table 8 shows the ten size groups for which the trade usually quotes separate prices.

Critchfield [34] found that practically none of the housewives interviewed in his study were familiar with the size groups used by the trade and that a good many distributors favor the adoption of only three major classes of prunes—large, medium, and small—with subclasses of 'extra large,' 'extra small,' and 'below grade.' Some large distributers are already packaging and labeling their prunes as
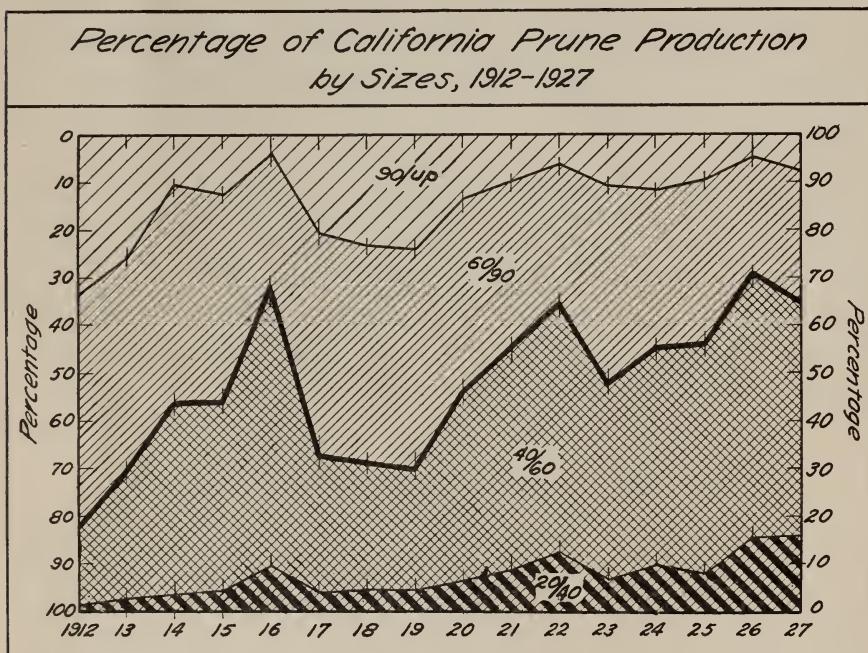

Fig. 9.—Since 1912 the proportion of California prunes 50/60 or larger has increased noticeably and hence the proportion of smaller prunes has declined. (Data from table 8.)

'large,' 'medium,' and 'small,' and are finding a relatively favorable response from trade and from consumers. Such classifications aid in merchandising because they are readily understood and used by consumers and tend to reduce the opportunity for misrepresentation.[35]

[33] The size classification generally used by packers in buying prunes from the grower, which differs from that described here, is given on page 42.

[34] The remainder of this paragraph is based on: Critchfield, B. H. Demand, marketing, and production of Oregon and Washington prunes. U. S. Dept. Agr. Dept. Circ. 416:13. 1927.

[35] Some members of the dried-fruit trade proposed the use of only four major size grades for California prunes as early as 1904. See: Market review on prunes. California Fruit Grower, Dec. 17, 1904. p. 9.

Trend and Variations in Proportion of Sizes.[36]—During the last two decades the proportion of California prunes 40/50 or larger in size has shown a notable increase, the proportion of 50/60's has tended to remain about the same (see figure 10) and the proportion of 60/70's or smaller has tended to decline (see fig. 11). The percentage of the state crop consisting of 40/50 prunes or larger has risen from an average of less than 20 per cent in pre-war days to about 40 per cent in recent years (see fig. 9 and table 8). On the
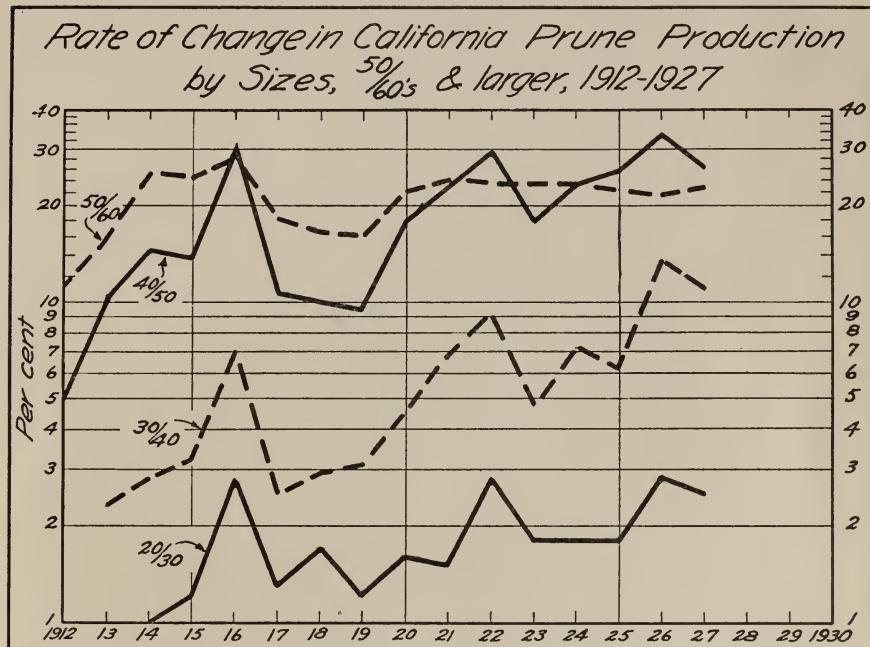

Fig. 10.—During the last twenty years the proportion of California prunes 40/50 or larger in size has shown a notable increase, while 50/60's have remained about the same. Changes from one year to the next in the percentage of 50/60's have been relatively slight, but in the case of 40/50's and larger, relatively great. (Data from table 8.)

other hand, only about 40 per cent of the crop has been as small as 60/70's during the last five years, compared with an average of approximately 60 per cent during the period 1912–1916. The relative increase has been most rapid in the case of 30/40's and the relative decline greatest in the case of 80/90's. Figure 9 enables one to compare the approximate rate of change in the trend of the relative output of different-sized prunes in California since 1912.

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[36] The influence of size upon the price of prunes is discussed briefly on page 58.

Figures 10 and 11 show how much more the proportion of some sizes has fluctuated from year to year than that of others. The percentage of the state crop falling in the 50/60 and in the 60/70 group has varied relatively less from year to year than for any other size. The greatest fluctuations have occurred in the case of larger sizes. Since 1920 the variation in the proportion of 50/60's has ranged only from 21 to 24 per cent, and of 60/70's only from about 14 to 19 per cent of the state total. The relative changes in the proportion of 20/30's, 30/40's, and 40/50's, however, have been much greater.
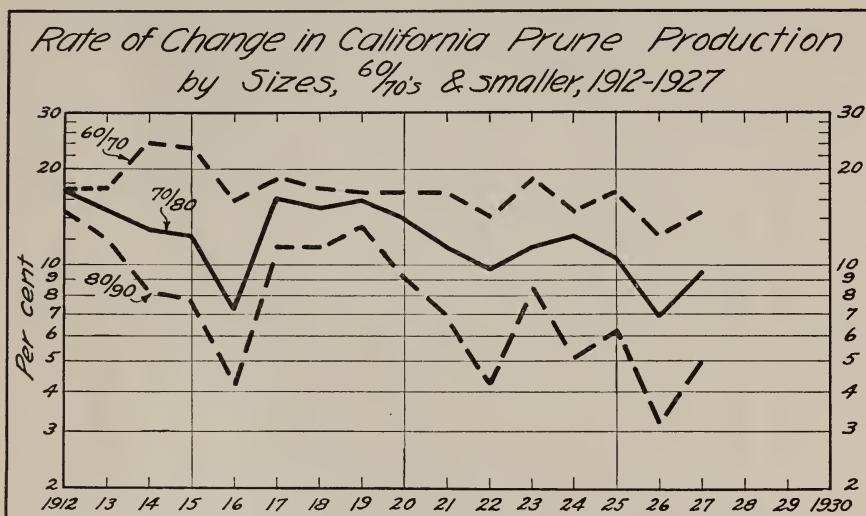

Fig. 11.—The proportion of California prunes 60/70 or smaller has been declining since 1912. Changes from one year to the next in the percentage of 60/70's and 70/80's produced are usually relatively small but are considerably greater for 80/90's and 90/100's. (Data from table 8.)

Proportion of Sizes in Chief Counties, 1925–1927.—The increasing proportion of large prunes produced in the state is to a considerable extent due to the fact that a large part of the increase in California production during the last fifteen or twenty years has taken place in those coast and Sacramento Valley counties which produce a large percentage of prunes 40/50 or larger. Figure 12 shows that in recent years from 40 to 60 per cent of the prunes produced in the coast counties and in Glenn, Colusa, Yuba, Sutter, and Yolo counties in the Sacramento Valley have averaged 40/50 in size or larger. Of the total output of the remaining prune-producing counties in the Sacramento Valley and those in the San Joaquin Valley and in southern California an average of only 15 to 30 per cent have been as large as 40/50's and hence conversely from 70 to 85 per cent have been 50/60's

or smaller. Such a large proportion of the state crop comes from counties a large percentage of whose crops consists of 40/50 or larger prunes that these sizes have constituted approximately 40 per cent of the total prune production of the state during recent years, compared with an average of less than 20 per cent from 1912 to 1916.

The coast counties of the state are the only ones aside from Yuba, Sutter, and Yolo, producing any appreciable proportion of 20/30 prunes and the percentage is less than 5 per cent of the output of
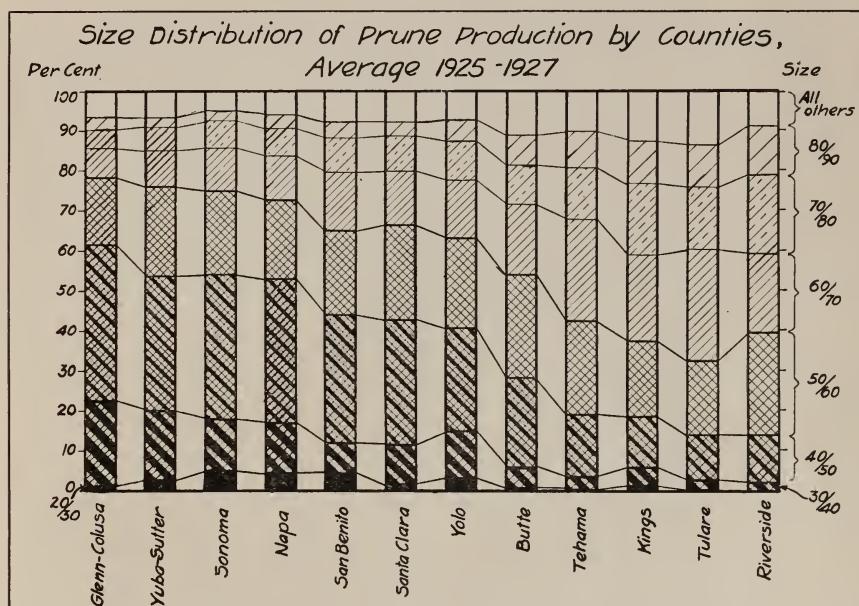

Fig. 12.—The coast counties and some Sacramento Valley counties produce a large percentage of medium and large-sized prunes. (Data from table 13, page 67.)

most of these counties. Prunes of the 30/40 size constitute from 10 to 20 per cent of the output from these same counties and less than about 5 per cent of the output from all other prune-producing counties in the state. The 40/50's constitute from 25 to 40 per cent of the output of the coast counties and of Glenn, Colusa, Yuba, Sutter, and Yolo counties, but only about 10 to 20 per cent of the output in the remaining counties. There has been less variation in the average proportion of the production of different counties consisting of 50/60 prunes than for any other size group during the last three years, the range being only from about 20 to 25 per cent.[37]

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[37] See table 13, page 67, for detailed data on size distribution of California prunes by counties and districts for the individual years, as well as for the average of the years 1925–1927.

Geographical Differences in Quality.—Available data indicate that the interior valleys produce only a very small percentage of prunes of as high a quality, judged by present trade standards, as the majority of prunes produced in the coastal valley districts of the state. As a result of extremely careful cultural, harvesting, and drying practices, however, some growers in the valley do produce prunes of a high quality. The results of these few growers show the possibility of other growers in the interior improving the quality as well as the size of their fruit by proper practices.[38]

Methods of Grading Prunes by Size.—Growers are usually paid for their dried-prune crop on the basis of the average number of prunes in a pound of any designated lot. Two methods of determining the average size of any given delivery are used in California.[39] At least 95 per cent of Santa Clara prunes are bought on the packers' grade sheets after being run through the grader at the plant where delivered. In the other prune-growing districts of the state, however, the door or sack test is the prevailing method of determining the size upon which a grower's payments are based.

Each grower's lot of prunes is size-graded [40] in most packing houses immediately after delivery and the weights of the lots falling into each of the different size grades and the average number of prunes per pound in each are determined and recorded on grade sheets. This system of grading constitutes the basis upon which all the members of the California Prune and Apricot Growers Association are paid and its use by this cooperative marketing organization has probably been to a considerable extent responsible for the tendency for many growers to sell to independent commercial packers on the same basis wherever growers are convinced that conditions favor such a method.

This method of determining the grade as the basis of selling prunes seems desirable wherever there are local grading plants to which growers deliver their prunes themselves and where grower-packer relations are satisfactory. The modern size graders in general use throughout the state permit of no manipulation. Growers who deliver to local grading plants can see their prunes run through the grader and the weight of the different lots recorded by sizes.

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[38] See: Tesche, W. C. Prune grade and quality problems. Pacific Rural Press 115:781, 788. 1928.

[39] Based on information supplied by Mr. C. F. Wells, Market Analyst, Division of Markets, California Department of Agriculture, and by the California Prune and Apricot Growers Association.

[40] For a brief description of this method of grading prunes by sizes see: Cruess, W. V. Commercial fruit and vegetable products. *pp. 422–424.* McGraw-Hill Book Co., New York. 1924.

Outside of the prune-producing section south of San Francisco Bay, the door or sack test [41] is the usual method employed by packers when buying from growers. Samples are usually taken from every fifth sack and the number of prunes per pound in the combined sample is assumed as representative of each load. As a mistake of one prune a pound in the representative sample may mean a difference of a dollar or more a ton, both growers and packers should see that sack tests are based upon a truly representative sample.

When the grader test is used, the size classes are for the most part in ten-point size classes. These classes, however, do not start on multiples of ten. They are standardized for both the grader and the sack test by the Dried Fruit Association of California and may be seen on standard grower contracts. The usual range within grader size-classes is as follows: to 24; 25–30; 31–33; 34–40; 41–51; 52–61; 62–71; 72–81; 82–91; 92–101; 102–121; 122–up. Sack tests are in three or four-point size-classes as follows: to 24; 25–29; 30–33; 34–40; 41–43; 44–50; 51–54; 55–57; 58–60; 61–65; 66–70; 71–75; 76–81; 82–91; 92–101; 102–121; 122–up.[42]

Output of Inferior Prunes Should Be Reduced.—In view of the great increase in California prune production, the low prices which have prevailed during the last few years, and the probability of larger average crops during the next few years, all factors in the prune industry should exert themselves to eliminate the production and marketing of small-sized and inferior prunes for table use. The grower and every factor between him and the consumer should study and learn just what size and quality of prunes different classes of consumers prefer. The differences in prices for different grades which growers receive and those at which prunes move in the trade should be made to reflect with as close a degree of accuracy as feasible the price differentials which consumers themselves place upon the different sizes and qualities of prunes. Proper premiums should be placed on high grade and drastic penalties against low ones. Consumers themselves should be better educated to appreciate the real differences which make some grades of prunes a tastier and more economical food than others.

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[41] See: Committee appointed by California State Department of Agriculture. Report on handling of California prunes. California Fruit News, Dec. 31, 1921. *p. 43.* This report describes very briefly all of the more important operations involved in handling prunes from harvesting and drying to packing and shipping.

[42] See page 37 for a brief discussion of the size grades for packed and processed prunes as sold to the trade.

Growers should use every means economically feasible not to produce prunes inferior in quality or very small, such as 90's or smaller.[43] If such prunes continue to be produced the industry should support a movement to see that they are retained by the grower or else used in making by-products which do not compete with dried prunes for table use.[44] Had all prunes smaller than 90's been kept off the market during the last three years the market supply would have been reduced by approximately 10 per cent. The supply would have been reduced still further had prunes of very inferior quality of larger sizes been withheld from the market.

The relative decline in the proportion of small-sized prunes produced in California is a healthy tendency, and it is fortunate that the industry has expanded so slowly in some of the counties which produce the largest proportion of small prunes. Growers who are producing prunes in localities which are not adapted to the economical production of prunes of good quality and of medium size or larger should turn to other enterprises in which there are reasonable prospects of securing an income large enough to support themselves. By doing so they will benefit themselves as individuals and incidentally the whole prune industry.

CHIEF USES FOR PRUNES[45]

Europeans eat many fresh prunes and, in Jugoslavia and Roumania particularly, they likewise utilize them on an extensive scale for two products, brandy (slivovitz) and jam (Pekmez, Pflaumenmus or Zwetchgenmus). Patton [46] estimates that normally about 40 per cent of the fresh prune crop of Jugoslavia is made into brandy and about 20 per cent into jam. Much of the prune crop of Roumania and

[43] A brief discussion of cultural and related methods by which the size of prunes may be increased is contained in an anonymous article, Profits from prunes. Sunsweet Standard 9(11):8–9. April, 1926. The conclusions reached in this article are that of the partially controllable factors influencing the size of prunes those warranting consideration are variety, number of trees to the acre, pruning, moisture, and fertility.

[44] See statement by Shaw, Earle J. Standardization of dried prunes, in American Cooperation: a collection of papers and discussions comprising the fourth summer session of the American Institute of Cooperation at the University of California, Berkeley, July 16–28, to be published by the American Institute of Cooperation, Washington, D. C.

[45] This section is based largely upon information derived from the laboratory and factory experience of the Fruit Products Laboratory of the University of California. See also: Mrak, Emil. New uses for prunes. California Fruit News, Feb. 25, 1928, p. 4.

[46] See: Wheeler, L. A. International trade in dried fruit. U. S. Dept. of Commerce, Bur. For. and Dom. Com. trade promotion series 44:44. 1927.

of several other European countries that grow large quantities of plums adapted to drying for prunes is also made into these last two products. Neither of them, however, is made or used in this country and it is improbable that a satisfactory domestic market for either of them could be developed. In foreign countries, moreover, prune jam ordinarily sells at a price for which California growers would not be willing to produce prunes.

In California prunes are grown primarily for drying only and nearly all of them reach the consumer in this form. Very few are canned commercially or consumed in fresh form. The varieties grown in the state are almost all very sweet in flavor and hence are not as popular in the fresh and canned form as the tart-sweet Italian prune (intermediate in taste between the sweet California prune and sour plums) grown so largely in the Pacific Northwest, of which a considerable tonnage is canned commercially or shipped to consuming markets in the fresh state.

Outlook for Canning California Prunes.—Up to the present no reasonably satisfactory method of packing California dried prunes in syrup in cans smaller than number 10 tins has been devised. A few years ago a considerable tonnage of dried prunes was packed in small cans for the retail trade, but so many cases were returned by eastern buyers because of hydrogen swells and perforated cans resulting from corrosion of tin plate that the enterprise proved unprofitable to the canners and the trade became discouraged with the line. The Fruit Products Laboratory of the University of California believes that methods of canning dried prunes in syrup in small cans can be devised and is working on the problem. It is probable, however, that several years will be required to perfect such methods and to convince canners and the wholesale trade that the danger of unprofitable spoilage of the product has been eliminated. Unfortunately, therefore, California dried prunes canned in syrup apparently will not offer an outlet for the disposal of any large quantity of prunes during the next few years when stimulation of consumption will be especially needed to help dispose of the very large normal crops in prospect.

Once the proper technique is worked out, however, a substantial tonnage of prunes will probably be packed and consumed in this form and the demand for prunes may be increased appreciably. Many persons who like prunes probably do not eat them as frequently as they would if they were spared the inconvenience of soaking and cooking them. The handiness of ready-to-serve canned prunes, together with the fact that they would be tastily prepared, should

stimulate consumption on the part not only of those who already eat stewed prunes but of many who do not eat them at all at present. Such a handy, tasty form should increase the demand for stewed prunes in restaurants. The canning of prunes in syrup, once it can be safely done, should, like the packing of a number of prune products which the Fruit Products Laboratory of the University of California is developing, appeal to commercial canneries because of the simplicity of the process, the low costs involved, and the convenience of an 'off-season' canning product.

New Uses.—The decline in prune prices resulting from the tremendous increase in production since the war has resulted in an effort to stimulate demand through the development of improved uses for the better grades of prunes and by devising by-products to utilize small and inferior prunes in such a way as to be appetizing and yet, in so far as possible, not directly competitive with table consumption of prunes as such. No by-products have as yet been devised that will remove inferior grades of prunes entirely out of competition with fruits or edible fruit products.

The Fruit Products Laboratory of the University of California has, however, developed some new and attractive methods of serving table prunes, and has devised some appetizing by-product uses for small-sized prunes. The processes involved in the commercial preparation of some of these products are relatively simple and cheap. Moreover such products offer canneries something to put up during the 'off season' when their plants would otherwise be idle. Since prunes are known as a healthful food there would seem to be promise of economically increasing the demand for them in the course of time if the new products can be produced at a low cost. The possibility of developing an extensive market for these products, however, in time to help much in relieving the industry of the present burden of low prices caused by over-production, seems remote. Market expansion for such of these products as have a permanent appeal to consumers and that can be produced at a low cost will probably be slow, judging from much of the experience in similar fields of endeavor. Demand will have to be created, distribution agencies educated, and competition from a host of other appetizing fruit products successfully overcome.

The two new products developed by the Fruit Products Laboratory of the University of California which seem to offer the most promise from the economic point of view are prune pulp and prunes canned in wine. The latter, although a very appetizing product, does

not utilize inferior fruit and is a food product which competes directly with many kinds of dessert fruits, including prunes, for a place in the consumer's diet. Prune pulp probably competes less directly with most canned, dried, or fresh fruits for a place in the consumers's diet, and it offers a method of utilizing small-sized fruit. It is the water-soaked pulp or flesh of the prunes, free from pits and having a smooth texture and consistency like that of fruit butter, but containing no sugar. Preparation of the fruit is a relatively simple process calling for but little equipment and labor. It is well adapted for use in a number of food products, chief of which are pie, ice cream, .and milk shake. None of these uses for prune pulp competes directly with prunes as usually prepared and served as fruit in the home. In ice cream and milk shake the pulp has proved popular wherever they have been introduced to patrons of soda-fountains and restaurants. However, it still remains to be seen how extensively and profitably these products will be manufactured and distributed at prices that will give the grower a satisfactory return on the small-sized fruit utilized.

PRICES OF CALIFORNIA PRUNES

For at least twenty years previous to 1905 the prune production of the world, and of California in particular, increased rapidly, causing California growers' returns per ton to decline rather steadily. Even before prices reached their lowest point, however, they discouraged the planting of prunes in all the important prune-producing sections of the world, for, about 1905, the trend of production began to drop. It was not until after returns had been improving for several years, nearly 1910, that it started upward again in California. Since about 1910 the trend of production (for the world as well as California) has been rapidly upward, while the trend of adjusted prices has been downward most of the time since pre-war days and most rapidly since the war (see figure 13).

The fluctuations in actual prices shown in figure 13 represent price changes that have been due to two sets of causes: one, the changing value or purchasing power of the dollar; the other, changes in the relation of the supply of, and the demand for, California prunes. Due to the general increase in the average level of all prices it has not been possible in any year since 1914 for Americans to purchase as many units of goods in general for a dollar as they could during the period 1898–1914 (with the exception of 1910). As a result of

this decline in the value of money, which reached its lowest level in 1920, as least two dollars were necessary in 1918, 1919, and 1920 to buy goods in general at wholesale which could have been bought for only about one dollar on an average during the years 1910–1914. This being the case, the dollars which prune growers received in these years were worth in general purchasing power less than half as much as those which they received and spent before 1914. During the last few years a dollar has purchased about two-thirds of what it would before the war. The curve of adjusted prices in figure 13 depicts changes resulting primarily from changes in the supply of, or the demand for, California prunes or from coincident changes in both. The effects of changes in the value of the dollar have been practically eliminated.
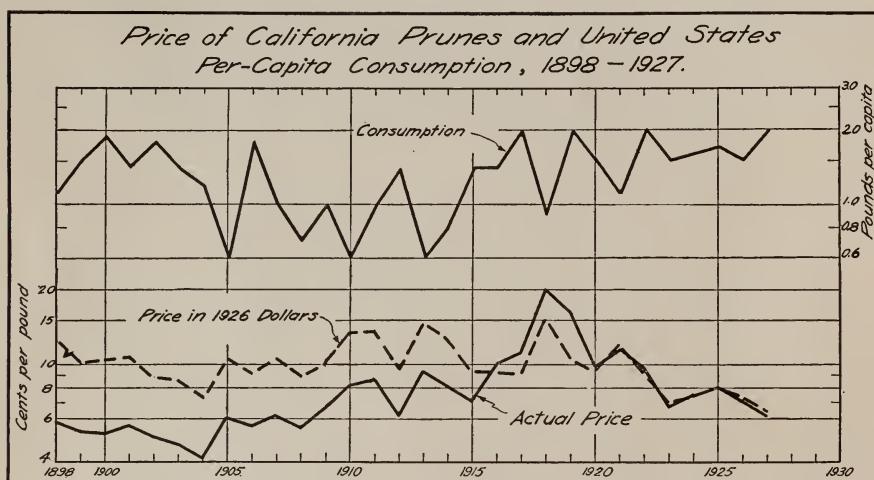

Fig. 13.—The trend of prune prices in terms of purchasing power has been downward since 1910. Domestic consumption of prunes is usually curtailed by high prices and increased by low prices. (Data on prices from table 10, page 50, and on consumption from table 5, page 31, with allowance for rough estimates of carryover, which are not shown in this table.)

A comparison of the curve of the actual average annual price of prunes per pound in figure 13 and the curve of adjusted prices (purchasing power or value) per pound in terms of dollars of average value or purchasing power during the calendar year 1926, makes it easy to understand why many persons were deceived, partially at least, by the high prices of prunes during and right after the war. Many growers failed to consider carefully how much less they could buy with the dollars they received for prunes than they could before the war, and many assumed that prices in general would continue to

remain on the high level of the war years. Actual prune prices are still no lower than they were before the war, but, when they are corrected for the general increase in the prices of all commodities, figure 13 shows that, in terms of what a pound of prunes would purchase, prunes have been below the pre-war level for several years, and that the trend is downward.

TABLE 9

FARM PRICE OF CALIFORNIA PRUNES PER TON AND PER BEARING ACRE, 1919-1927

Year	Price per ton		Price per ton in terms of 1926 dollars		Gross income per bearing acre			All-commodity wholesale-price index
						In terms of 1926 dollars		
	Dollars	Per cent of 1920–24 average	Dollars	Per cent of 1920–24 average	Price dollars	Dollars	Per cent of 1920–24 average	
	1	2	3	4	5	6	7	8
1918	161	132	123	101	70	53	43	131
1919	240	197	160	131	312	208	171	150
1920	130	106	124	102	120	114	94	105
1921	130	106	138	113	122	130	107	94
1922	140	115	139	114	138	137	112	101
1923	100	82	103	84	109	113	93	97
1924	110	90	107	88	119	115	94	103
1925	110	90	110	90	116	116	95	100
1926	100	82	105	86	96	101	83	95
1927*	70	57	72	59	81	83	68	97
1928								
1929								

* Data for 1927 are preliminary and subject to revision.

Sources of data:

Col. 1.—Farm value per ton are estimates of the California Crop Reporting Service compiled from its annual reports.

Cols. 3 and 6.—Items in cols. 1 and 5 respectively divided by wholesale-price index in col. 8 for corresponding year.

Col. 5.—California Crop Reporting Service's estimates of growers' farm income from California prunes divided by its estimates of bearing acreage for corresponding years. Estimates of farm price from col. 1; production and bearing acreage from table 1, page 14.

Col. 8.—U. S. Bureau Labor Statistics all-commodity wholesale-price index for the United States for crop years beginning October 1 converted on a 1926 calendar year base of 100. The 1927 index is for 10 months only.

Data in table 9 show that the trend of gross returns to prune growers of the state per bearing acre as well as per ton have been downward since the war. The fact that the normal yield of prunes per bearing acre has been fairly constant in recent years accounts for the trend of returns per acre being just about the same as that per ton. The decline in the price of prunes in recent years has been due

TABLE 10

CALIFORNIA PRUNE PRODUCTION AND PRICES, 1886–1928

Crop year	Production		Price in cents per pound	Adjusted price in terms of 1926 dollars		Price index
	Millions of pounds	Per cent of 1910–14 average		Cents per pound	Per cent of 1910–14 average	
1	2	3	4	5	6	7
1886	4	3				
1887	8	6				
1888	8	6				
1889	17	12				
1890	16	12	11.5	22.1	173	52
1891	28	20	8.8	17.7	139	50
1892	23	17	11.5	23.0	180	50
1893	52	28	7.4	15.8	124	46
1894	45	33	6.9	15.5	121	45
1895	65	47	5.9	13.6	106	43
1896	55	40	5.5	12.8	100	43
1897	98	72	5.4	12.4	97	43
1898	90	66	5.8	12.2	95	47
1899	114	83	5.3	10.0	78	53
1900	174	127	5.2	10.2	80	51
1901	82	60	5.6	10.5	82	54
1902	195	142	5.0	8.8	60	57
1903	165	120	4.7	8.5	66	56
1904	135	99	4.1	7.3	57	56
1905	63	46	6.0	10.5	82	57
1906	180	131	5.6	9.2	72	61
1907	105	77	6.1	10.3	81	59
1908	57	42	5.5	8.9	70	62
1909	150	100	6.6	9.9	77	66
1910	80	58	8.2	13.5	106	61
1911	190	139	8.6	13.6	107	63
1912	205	150	6.2	9.5	74	65
1913	96	70	9.4	14.6	114	64
1914	112	82	8.2	12.7	99	64
1915	185	135	7.1	9.4	74	76
1916	157	115	10.0	9.2	72	108
1917	218	159	11.1	9.1	71	123
1918	90	66	20.0	15.2	119	131
1919	270	197	16.2	10.7	84	150
1920	195	142	9.8	9.4	74	105
1921	200	146	11.3	11.9	93	94
1922	220	161	9.2	9.2	72	101
1923	260	190	6.7	6.9	54	97
1924	278	203	7.5	7.4	58	103
1925	292	213	8.0	8.0	63	100
1926	300	219	7.0	7.4	58	95
1927	406	296	6.1	6.3	49	
1928	370*					

* Data for 1928 are preliminary (October estimates) and subject to revision.

Sources of data:

Col. 2.—Compiled from the California Fruit News (called the California Fruit Grower before 1913) and annual California Crop Reports.

Col. 4.—Wholesale price quotations to jobbers for 60/70 size California prunes in 25-pound boxes in New York City. Simple annual average of

monthly quotations of the two highest grades (frequently designated as 'Santa Claras' and 'outside') for crop years beginning October, except for the years 1904–1906, 1910, and 1912. To avoid undue influence of the prices for a few months near the close of each of these crop years an average price for the months of October–June inclusive was used for the crop year 1904, of October–May for 1905 and 1906, and of September–January for 1910 in which crop year approximately 95 per cent of the California crop had moved from the state by February. Monthly data compiled from the Wholesale Price Bulletins of the U. S. Bureau of Labor Statistics, which Bureau compiled the data from the New York Journal of Commerce and Commercial Bulletin taking a monthly average of the weekly quotations (average of the range of price on Tuesday) in recent years. Previous to the war the monthly price was the average of the range of quotations on the first of each month.

Col. 5.—Items in col. 4 divided by the index number for the corresponding year in col. 7 for reasons explained on page 47.

Col. 7.—U. S. Bureau of Labor Statistics all-commodity wholesale-price index for the United States for crop years beginning October converted to a 1926 calendar year base of 100 by dividing the index on a 1910–1914 base by 1.566.

largely to increasing production from prune trees planted in the state under the stimulus of the temporarily high, and hence misleading, prices which prevailed for several years as an indirect result of the war.

Inverse Relation of Consumption and Price.—The tendency, particularly in the years before the war, for the per-capita consumption of prunes in the United States to be curtailed when prices were high or to increase when prices fell is shown by a study of figure 13.[47] More frequently than not an increase in per-capita consumption from one year to the next has been accompanied by a decrease in the price (in terms of 1926 dollars), made necessary, apparently, to induce consumers to eat more prunes. Conversely, a decline in consumption has usually been attended by an increase in price. Apparently, the more prunes we can move into foreign markets at fair prices, thereby holding down per-capita consumption in this country, the better the returns which California prune growers can get for their crop.

World Supply the Chief Factor Affecting Prices.—Figure 14 indicates that the world supply of prunes is the most important factor determining the wholesale price of California prunes and should be the chief factor determining growers' prices. Each black dot indicates the relation between the wholesale price and the approximate tonnage of prunes moved into consumption in the crop year indicated by the number beside the dot. Each dot is placed far enough to the right to correspond to world consumption for a given year and high

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[47] Rough adjustments for carryover have been made in the per-capita consumption data pictured in figure 13 and hence they are not identical with the corresponding data presented in table 5.

enough to correspond to the average wholesale price of California prunes during the same crop year. To illustrate, the world consumed about 150,000 tons of prunes in 1912 and the wholesale price of California prunes during the crop year averaged about 9.5 cents a pound (adjusted). The black dot marked 12 (1912) was located as indicated by the light dash lines S–12 and P–12. The other dots are located in the same way.
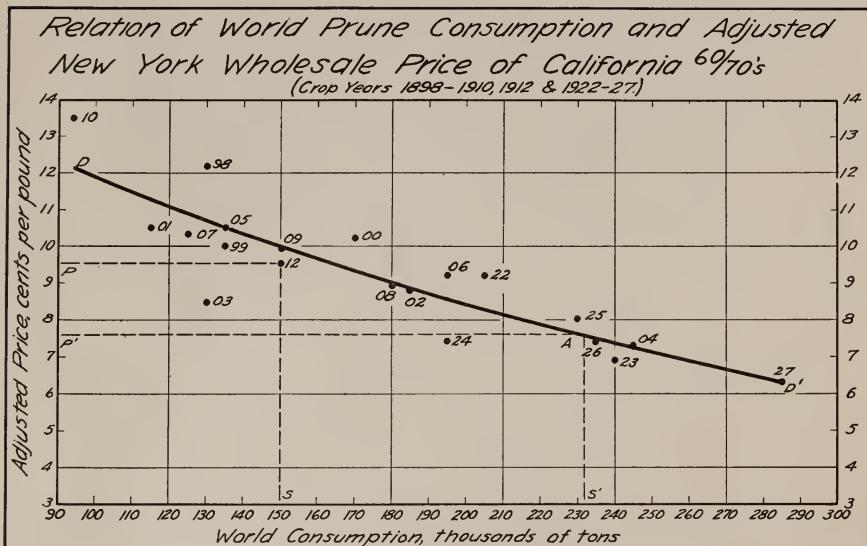

Fig. 14.—Changes in world consumption have accounted for nearly 75 per cent of the changes in the wholesale price of California prunes. Each black dot indicates the relation between world consumption and the price of prunes (in terms of dollars having a purchasing power equivalent to 1926 dollars) in the crop year indicated by the number beside the dot. (For example, *12* stands for *1912*.) The line *dd'* shows the average relation between these two factors for twenty years, and, judging from supply only, indicates at about what wholesale price different-sized world prune crops could probably have best been moved into consumption without causing carryovers. For a more complete discussion, see text, pages 51–53. (Data from table 2, page 19, and table 10, page 50.)

The line *dd'* shows how great the tendency is for the price of prunes to decline when annual world consumption is large or to rise when supplies are small. It is a line of average relationship based upon all the black dots and drawn so as to lie as closely as possible to all of them and at the same time to be smooth. If the data determining the position of the black dots were absolutely correct and the world supply of prunes moving into consumption were the only factor influencing price, all the black dots would fall exactly on the curve *dd'* and one could determine at just what wholesale price any

given-sized world crop of prunes could be moved into consumption without causing any carryover. The data by which the position of a number of the dots is determined are, however, very rough estimates, particularly as regards the tonnage of prunes which have moved into consumption in any given year.[48] Moreover, it is impossible to determine at just what average price the whole supply of California prunes in any given years was sold, let alone that at which those produced elsewhere sold.

The average relationship shown by the line dd' indicates that nearly 75 per cent of the changes in the annual wholesale price of California prunes can be accounted for by changes in world consumption of prunes.[49] Apparently there are other factors than the supply that affect the price which consumers will pay for prunes. Demand, that is, the amount that will be bought at any given price, may change as a result of advertising or because of improved, standardized, and more attractive quality and packages or because of changes in the available supplies and prices of competing fruits. Indications are that, in order to induce consumers to eat a given tonnage of prunes, a lower price will be necessary when other fruits are plentiful and cheap than when they are scarce and high in price. No doubt the reason that so many prunes were sold at a high price in 1921 was the general scarcity and the high price of many other fruits. Low prices and large crops of apples and raisins in 1912 probably help to account for the fact that the price of prunes was lower in that year than world supply alone would indicate as correct.

Psychological factors may likewise influence the opinions of growers and the trade regarding demand, supply, and price. In a number of the years for which prices are below the line dd' in figure 14, as in 1901, packers and wholesalers were extremely bearish, partly because prices had been too high the previous year and had resulted in a declining price, causing losses to those in the trade who had bought at high prices early in the season, and partly because movement into consumption was retarded by high prices, causing a carryover. On the contrary, prune prices for the 1911 crop were unreasonably high, largely because so many dealers made such large profits on the 1910

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[48] The data on purchasing power used in figure 14 are from col. 6 in table 10 and are described in the footnote to that table. The data compiled by the author on world commercial production (see table 2, page 19, and footnote 22, page 21) are rough estimates, particularly for pre-war years, and hence the conclusions given above, which are based thereon, are tentative only, subject to whatever gross errors may be resident in the data.

[49] The inverse correlation between price and consumption as shown in figure 14 is about —0.85.

crop, which was very short, causing prices to skyrocket. Many speculators bought prunes at high prices in the fall of 1911 holding them for the rising prices which never matured, and selling them finally at declining prices. The fall of 1912, therefore, found the trade so pessimistic that the price of the 1912 crop of prunes was abnormally low, considering world supply.

Value of Figure 14 in Estimating Prices.—Although the curve of estimated prices (*dd'*) in figure 14 should be useful in estimating the approximate wholesale price at which different-sized world crops of prunes can be sold in the future, other factors than supply must be taken into consideration. In the past some crops have apparently all moved into consumption during the current crop year at considerably lower prices and some at considerably higher prices than the curve *dd'* would indicate. Over 25 per cent of the difference in the prices pictured in figure 14 must be accounted for by the factors other than world consumption, such as fluctuations in demand due to changes in consumers' purchasing power, or in the effectiveness of advertising and merchandising methods, or in the supplies of competing fruits. Some of these facts are difficult to secure accurately and cannot be measured statistically. A trained judgment that can ordinarily be acquired only as a result of intimate first-hand acquaintance with the business of marketing prunes is, of course, essential in deciding what is probably the best price policy to pursue under the conditions existing at any particular time.

To illustrate how a grower might use figure 14 to determine about what price he should receive for his prunes at harvest time let us take the estimate of 1928 world commercial production of September of approximately 232,000 tons.[50] Locate 232 on the horizontal scale on the bottom line and from this point run a dotted vertical line up until it cuts *dd'* at *A*. Then from this point run a dotted horizontal line over until it strikes the left-hand vertical price scale at *P'*. Other factors being normal, this point indicates that all of the estimated 1928 world commercial output of 232,000 tons of prunes can probably be sold during the next twelve months at an average New York wholesale price level of about 7⅝ cents a pound for 60/70 prunes (which average about 69 to the pound). Other influences on price, however, such as those mentioned in the paragraph above, may not be normal, and hence this estimated price might prove to be somewhat higher or lower than the average price at which California prunes actually sell.

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[50] Current prune prices to California growers and estimated world commercial production for 1928 as used in this illustration are taken from issues of the mimeographed Dried-Prune Reports, issued by the Division of Markets of the California Department of Agriculture.

The grower, however, is interested in estimating the price which he himself might expect if packed prunes averaging 69 to the pound sell for about 7⅝ cents a pound in New York during the coming crop year. It is estimated that the margin or difference between the price at which the wholesaler sells to grocers in New York and the price paid the California grower by packers is normally about 3 cents a pound.[51] Subtracting 3 cents from 7⅝ cents gives an estimated farm price of 4⅝ cents a pound to the California grower for prunes 69's in size.

To estimate the price of any other size from the estimated farm price of 4⅝ cents for 69's the grower must take into consideration the prevailing price differentials being paid by packers. To illustrate: the average basis price which California growers reported packers as paying for 62/71's during the three months of July through September, 1928, was about 4 cents and for 41/51's was 4⅝ cents. These basis prices converted to actual prices per pound are 4.6 cents for 69's and 6.2 cents for 49's.[52] Apparently 49's brought the grower a premium averaging about 1.6 cents a pound over 69's. Adding 1.6 cents to the estimated farm price of 69's of 4.6 cents gives an estimated farm price for 49's based upon figure 14 of 6.2 cents, or the same average price which California growers reported as receiving for their 1928 output of 69 prunes. This agreement of estimated with actual price may, in small part, be due to mere chance. The estimated price might easily differ from the actual farm price considerably in some years, even though the latter were properly in line with the true market situation. The factors other than world supply mentioned on page 54 as accounting for about 25 per cent of the changes in prices in some years might be far from average in some years, whereas they appear to be close to normal in 1928.

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[51] This rough estimate is based upon current trade information which indicates that in order to cover his costs and a normal profit, the packer usually plans on selling 25-pound packed boxes of prunes f.o.b. California shipping points at about 1½ cents a pound more than the price which he pays the grower. The New York wholesaler probably has to sell to the retail grocer at an average price about 1½ cents a pound higher than the f.o.b. price paid to the California packer. No doubt these margins vary somewhat with changing market conditions. A comparison of packers' quotations f.o.b. California and New York wholesale quotations on 60/70's during the crop years 1925 and 1926 shows the average and most frequent monthly difference to be 1⅛ cents a pound.

In comparing the price received by the grower with the price at which the packer sells packed prunes to the trade one must also consider that the packer's margin is increased by the gain in weight resulting from the moisture absorbed in processing, which varies somewhat with different sizes of prunes, but probably averages between 3.5 and 4.0 per cent according to different estimates.

[52] See page 57 for the method of estimating the actual price per pound from the basis price.

Supply-Price Relation Less Consistent Than Before the War.—
The relationship between world production and the price of prunes
has not been so consistent since the war as before. For several years
after the war it was unusually difficult to judge at what prices
different-sized prune crops would move into consumption and the
trade was not well informed regarding Jugoslavian supplies. Sudden
changes took place in the general price level and very abnormal
economic conditions existed in our chief foreign markets which
seriously affected the purchasing power of European countries, par-
ticularly of those in Germany, ordinarily the largest importer of our
prunes. The greatly increased output of fruits—fresh, canned, and
dried—since the war has also added to the difficulty of properly
pricing and marketing prunes.

It is unfortunate for the industry that prices have not been better
adjusted to world conditions of supply and demand. Since the war
the opening price of prunes in a number of years was too high to
move the large world supply, and consequently prices declined, caus-
ing those in the trade who stocked up with prunes to lose money and
discouraging them from handling the product and pushing it into con-
sumption and also causing carryovers which tended to depress prices
the following year. The net result has been that growers and most of
the factors in the trade have made less money than they would have
made had prices been such as to insure the trade reasonably profitable
margins and to create a confident tone to the market, which would
stimulate the pushing of prunes into consumption at a time of heavy
world production and of keen competition from other fruits as well
as of low consumer purchasing power in some of our chief foreign
markets, such as Germany.

Partly as a result of this unfortunate situation the buying policy
of the entire prune-distributing trade has undergone decided changes
in recent years. In 1926 Critchfield found that a general hand-to-
mouth buying program prevailed. ''The volume of purchases of
prunes for future delivery by the jobbing and wholesale distributors
is much less than it was in earlier periods. There has been a notice-
able change in the number of speculative jobbers. Formerly specula-
tive jobbers acted as a shock-absorbing or reservoir agency and carried
the growers' crops until the wholesale and retail distributors were in
need of supplies. Only a few such firms are in operation now. ...
Large stocks of prunes are no longer purchased and held. Immediate
needs only are anticipated and met. Chain-store buyers purposely
follow this policy; the 'cash and carry' wholesalers have adopted

it; and many regular wholesalers stated that in general they also were forced to buy only for their immediate needs."[53]

Methods of Quoting Prices to Growers.[54]—Formerly packers usually bought prunes from growers at a single 'basis' price with a uniform differential per point which was applied to prunes of all sizes. The old single or fixed 'basis' price was for prunes averaging 80 to the pound. For prunes larger than 80's a uniform additional premium of 1/20 of a cent a pound, the equivalent of a dollar a ton, was added to the basis price, for every 'point' that a given lot of prunes averaged larger than 80. The same amount was subtracted for every 'point' smaller than 80. For example, prunes averaging 81 to the pound being one 'point' smaller in size than 80's would bring 1/20 of a cent a pound or $1 a ton less than the 'basis' price. Prunes averaging 35 to the pound, being 45 points larger in size than 80's would bring 2¼ cents or $45 a ton more than the basis price. This system of payments is sometimes called the 'five-points basis' system because the uniform differential of one-twentieth (1/20) cents a pound as a decimal is five-hundredths (0.05) of a cent or 0.0005 of a dollar a pound. Special premiums for certain of the larger sizes that were particularly scarce in any one year were sometimes paid growers in addition to the price as calculated by the method described above. For example, 30/40 prunes frequently commanded a premium of ½ to ¾ of a cent a pound above a price calculated by the uniform 'five-point basis' system.

Partly as a result of changing conditions of the supply of, and the demand for, different sizes of prunes (see pages 39–41) some sizes so frequently commanded an extra premium over the uniform differential of one dollar per ton per point in size that a 'varying-basis price' system has finally been rather generally adopted in the state. The essential difference between this system and the old system is that a different basis price is quoted for different sizes of prunes instead of a single basis price for all sizes. Under this system a difference of ten points in size, such as that between 70's and 60's, does not necessarily result in the same price differential as the ten-point difference between the size of 60's and of 50's, as was the case under the old system unless special premiums in addition to the regular dollar per size-point were definitely agreed upon.

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[53] Critchfield, B. H. Demand, marketing, and production of Oregon and Washington prunes. U. S. Dept. Agr. Dept. Circ. 416:28. 1927.

[54] Discussion and illustrations of packers' methods of quoting prices to growers are given in: California State-Federal Joint Marketing Service. Dried-Prune Report 2:1–3. California Dept. Agriculture (mimeo.). August 15, 1928. See also Kieffer, D. L. Up and down from base 80. Pacific Rural Press 126:620–621. 1928.

Given the basis price for any particular size of prunes, however, the method of calculating the actual price per pound under the newer system is the same as under the old. One-twentieth of a cent per pound or one dollar a ton is added or subtracted from the basis price for every point that the given size of prunes differs from 80's. Under the varying-basis price system if the basis price for 41/51's is 5 cents, then a lot of prunes averaging 45 per pound, or 35 size-points larger than 80's, would bring 6¾ cents per pound—[5 cents + (35 × 0.05 cents)], or $135 per ton—[($0.05 × 2,000) + (35 × $1.00)].

On very large sizes and very small sizes a 'flat,' actual (not a 'basis') price is frequently quoted: so many cents per pound for any of the sizes within the particular size class quoted. For example, in the fall of 1928 prunes 24 or less to the pound were quoted to some growers at a 'flat' price of 10½ cents a pound, 25/30's at 10 cents, and 31/33's at 8¼ cents. Sizes 34/101's were quoted at varying basis prices but 102/121's were quoted at a flat price of 2 cents and 122 or smaller at 1½ cents a pound.

To insure himself of fair treatment by buyers and better to understand the relation of prices and sizes of prunes, every grower should thoroughly master the intricacies of the cumbersome system by which dried prunes are bought and sold.

Influence of Size on Price.—The price of any size of prunes is affected not only by changes in the total supply of prunes available at any particular time, but also by changes in the relative plentifulness or scarcity of that particular size. In a general way the available evidence indicates that a substantial increase from one year to the next in the proportion of prunes of any given size usually results in a noticeable decrease in the relative premium paid for that size. Conversely, a marked decrease from one year to the next in the proportion of a particular size generally results in an increase in the relative premium paid for that size. In recent years this tendency for the relative price differential for a given size to fluctuate in the opposite direction from the proportion of the total supply which the size constitutes is most evident in the case of the larger sizes of prunes.

Table 11 indicates that the relative premium paid for large prunes has tended to increase during the last decade or more, whereas the relative differential against small prunes has been increasing. In view of the fact that the proportion of large-sized prunes has shown a noticeable increase during this same period[55] it would seem that the

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[55] See discussion on page 39.

demand for large prunes has been increasing at the expense of that for the small-sized prunes. Otherwise one would expect to find the price of large prunes declining relative to that of small prunes. This tendency serves to emphasize the importance of reducing the output of small and inferior prunes.[56]

TABLE 11

FARM PRICE OF PRUNES BY SIZES, AVERAGE 1917–1920 AND 1922–1925

Size	1917–1920		1922–1925	
	Cents per lb.	Per cent of average	Cents per lb.	Per cent of average
20/30	16.5	185	12.4	224
30/40	13.0	146	9.1	164
40/50	11.5	129	6.9	125
50/60	9.9	110	6.1	110
60/70	9.0	101	5.4	97
70/80	7.8	87	5.1	93
80/90	6.8	76	4.3	77
90/100	6.1	68	2.9	52
100/120	4.7	53	1.7	32
120/up	4.0	45	1.4	26
AVERAGE..	8.9	100	5.5	100

Source of data:

Returns to members of the California Prune and Apricot Growers Association for Sunsweet prunes. Compiled from the Sunsweet Standard.

[56] Some illustrations of how the size of prunes affects growers' incomes and profits are contained in the following article: Anonymous. Profits from prunes. Sunsweet Standard 9(10):6–8. March, 1926. The following quotations from the summary of a mimeographed report of the Farm Adviser of Napa County giving detailed average costs of producing prunes on about twenty prune orchards in that county strongly emphasize the necessity of producing a large tonnage of large-sized fruit in order to make profits. "Prunes smaller than 100 to the pound seldom, if ever, pay the cost of production. . . . . The records of one of the growers in this study prove that irrigation, fertilization, and intelligent cultivation will take a non-profitable prune orchard and make it pay by increasing the size of fruit and improving the quality." (Anonymous. Napa reckons prune costs. Pac. Rur. Press 114:656. 1927.) The conclusions reached upon the basis of the limited data presented in the two articles referred to above are that the successful grower is successful because he raises large prunes of good quality and because he secures a large acre-yield at an economical expenditure of management, labor, and capital. Some facts on cost of production that throw some additional light on the relative profitableness of different sizes of prunes may be found in: Newman, Ralph. Tehama prune men confer. Pac. Rur. Press 110:674. 1925.

PROBLEMS OF ADJUSTMENT[57]

Needed Remedial Measures.—If the forecasted production of prunes actually matures and reaches the market during the next few years, prices will have to be low to induce consumers to use all the available supply, or else growers, selling agencies, and others financially interested in the industry will have to unite in a determined and constructive remedial program. Such a program would involve measures (1) to reduce the acreage and commercial production of prunes, (2) to lower production costs, (3) to improve size and quality, (4) to eliminate small and inferior prunes from consumption as table fruit, (5) to reduce costs of marketing, (6) to improve and widen distribution, and (7) to stimulate foreign and domestic demand.

The probability that market improvements alone will not prevent prune prices from averaging unprofitably low to an abnormally large proportion of California growers during the next few years suggests that the lower grades and smaller sizes of prunes should be eliminated from consumption for table purposes in so far as feasible. Moreover, more efficient production methods should be used wherever possible in order to cut costs per ton and, at the same time, means should be taken to improve the size and quality of the prunes produced—a combination admittedly very difficult of attainment.

Growers in localities not well adapted to producing high yields or a quality and size of sufficient superiority to offset low yields should carefully consider possible alternative or supplementary enterprises whereby they may increase their income by drawing a larger proportion of it from sources likely to be more remunerative than prunes. Apparently growers who are largely dependent upon prunes for their income and who cannot make a living from prune production at prices averaging as low as those of recent years, may be forced to discontinue farming for themselves unless they can quickly substitute crops capable of bringing them a living, or else supplement their farm income by wages earned elsewhere. The reduction in production and the rise in prices resulting from readjustments by individual growers along these lines would, of course, redound to the benefit of the industry as a whole.

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[57] Some of the chief economic difficulties with which California farmers are now confronted, and possible remedies and adjustments are discussed briefly in a circular by the staff of the College of Agriculture: The agricultural situation in California. California Agr. Ext. Ser. Cir. 18:20–30. 1928.

Limited Influence of Market Improvements on Prices.—Even though extraordinary improvements were to be made in marketing prunes during the next few years it is improbable that the net result would be sufficient to entirely overcome the depressing effect of heavy production upon prices. Marketing improvements would be worth working for, however, for they should result in the grower receiving higher prices than he would be able to get without them. The test of the value of efforts to improve distribution will be whether prices are better than they would have been had no such changes been made, and not on whether prices are actually higher during the period in which the improvements are in effect.

In judging the success of the agencies which market their prunes during the next few years, growers should always use this measure, otherwise they are destined to feel that the marketing of their crop is unsatisfactory. Under competitive conditions the best marketing organization and salesmen in the world cannot force consumers to pay growers a profitable price for their crops when too much is produced. Glutted markets and ruinously low prices, due to increasing output much faster than demand, emphasize a fact often forgotten at planting time: namely, that many problems of marketing cannot be separated from problems of production.[58]

In so far as possible, plans for expanding the market for a farm product should be made at the same time any extended movement to increase the output originates, and expansion of markets should be made to keep pace with increasing production. In order to successfully establish a reasonably profitable and stable equilibrium between production and marketing or the supply of, and the demand for a farm product, growers must secure the intelligent and sympathetic cooperation of all agencies that are to any considerable extent financially dependent upon the commodity either directly or indirectly, such as financial, transportation, and marketing organizations. The peculiar nature of agricultural industries[59] unfortunately makes effective action upon the part of growers alone extremely difficult. There-

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[58] B. H. Hibbard believes that the major part of the ultimate solution of the marketing problem consists in adapting production to demand. ''No farmer or group of farmers,'' he states, ''can hope to make over the demand for agricultural products, though in particular instances it may be influenced. The main task of the farmer in conquering the marketing difficulties is to get market information and act on the basis it affords.'' (Hibbard, B. H. Marketing agricultural products. *p. 377.* Appleton & Co., New York. 1921.)

[59] Some of the more important characteristics of farming peculiar to agriculture as an industry and their economic significance is briefly discussed in: Ely, R. T., and E. W. Morehouse. Elements of land economics. *p. 98–109.* Macmillan Co., New York. 1924.

fore, for the good of all, other agencies should lend foresighted and constructive aid that will help to prevent the difficulties that demand so much remedial assistance.

Many agencies other than growers and many influences other than agricultural must share the responsibility for the overplanting of fruit which occurred in California after the war. Many of the financial difficulties which growers face are the result of conditions created directly or indirectly by the war. The sudden and great changes in the general level of prices during the last fifteen years (see pages 47–49) have been at the bottom of the financial difficulties of many growers. The high general price level during and right after the war made many believe that their net incomes were much larger than they actually were. When the bottom dropped out of the prices for agricultural staples, such as grain, right after the war, the prices of most fruits remained at relatively high and more profitable levels, encouraging a shift toward fruit planting in many sections of California. While fruit prices were high, much land was bought and sold for fruit growing at a very high valuation based on the assumption that high prices would rule when the newly planted orchards finally came into bearing.[60]

When great declines in fruit prices finally came, as a result of the great increase in production coming from young bearing orchards planted in boom times, attempts were made by a number of agencies to hold the price of certain fruits too high. This resulted in moving them into the trade at declining prices, thus demoralizing the market by making their distribution unprofitable to the trade and by causing serious carryovers (see page 56).

Danger of Setting Prices Too High.—Great care should be exercised during the next few years to sell prunes at a price low enough to move large crops into consumption readily before the following year's crop is ready for market. The experience with carryovers which the raisin and the canning-peach industries are having and that through which the prune industry has passed in some years since the war should convince prune growers that it is suicidal to hold prices high enough to cause substantial carryovers from one crop year to the next during a period in which average production is very large. In

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[60] After many years of observation of fruit growing in all sections of the United States, Chandler has concluded that ''only intelligent and cautious study of the situation by buyers can reduce the number of serious losses by people going into the orchard business.'' (Chandler, W. H. North American orchards. *p. 501.* Lea and Febiger, Philadelphia, 1928.) In this concluding discussion in Chapter 24 he summarizes the problems which prospective orchardists should consider in going into the business of fruit growing.

recent years fluctuations in the size of California prune crops have not been very large, and California production has largely dominated fluctuations in world output. The possibility of a failure of the California prune crop serious enough to justify taking the chance of holding any considerable quantity of prunes over from one year to the next is rather remote. As a general rule the price of prunes should be kept at such a level that substantially all of each crop moves into consumption during its own crop year or is completely removed in some way or other from being carried over to depress prices in the following crop year.

Unless growers and selling agencies unite in a determined, constructive program which results in lowering of market costs and in increasing the demand for prunes, there is little likelihood of getting higher prices for large crops of prunes than those that have prevailed in recent years for world crops of similar size. If prunes are not intelligently and energetically pushed into consumption and the market greatly broadened, growers, as a group, may expect a continuation of low prices on an average, unless production is curtailed. Any attempt to keep part of the prune crop from being harvested or marketed, however, will encounter the same kind of difficulties which the canning-peach and the raisin growers of the state have experienced. History records few, if any, economically successful attempts to dispose of large surpluses of semi-perishable farm products like dried fruits, whose cyclical period of over-production usually lasts several years because of the peculiar difficulty of quickly reducing acreage.

APPENDIX OF TABLES

TABLE 12

California Bearing Prune Acreage by Counties and Districts, 1921–1928, and Non-bearing, 1928

County and district	1921 Per cent of total	1921 Acres	1922 Acres	1923 Acres	1924 Acres	1925 Acres	1926 Acres	1927 Acres	1928 Bearing Acres	1928 Bearing Per cent of total	1928 Bearing Per cent increase over 1921	1928 Non-bearing Acres	Non-bearing Per cent of total	Non-bearing Per cent of bearing	Total Acres	Total Per cent of total
State total	100.0	106,269	111,383	119,429	128,704	138,753	155,978	165,199	172,006	100.0	62.0	20,975	100.0	12	192,981	100.0
COAST DISTRICT:	72.2	76,805	77,901	83,008	89,876	87,260	111,615	118,732	121,989	70.9	59.0	10,981	52.4	9	132,970	68.9
Coast south of Bay	49.1	52,194	52,364	54,931	57,448	62,279	73,753	77,648	79,913	46.5	53.1	5,311	25.4	7	85,224	44.2
Santa Clara	42.9	45,679	45,679	47,422	49,164	52,164	62,296	64,039	65,585	38.2	43.6	3,476	16.6	5	69,961	35.8
San Benito	2.4	2,500	2,860	3,220	3,581	4,560	5,539	6,519	6,977	4.1	179.1	825	3.9	12	7,802	4.0
Contra Costa	0.8	900	600	650	700	820	1,052	1,926	2,126	1.2	136.2	500	2.4	24	2,626	1.4
San Luis Obispo	0.8	815	875	1,189	1,503	2,160	2,216	2,273	2,400	1.4	194.5	180	0.9	8	2,580	1.3
Alameda	1.5	1,600	1,600	1,650	1,650	1,675	1,700	1,843	1,800	1.0	12.5	200	1.0	11	2,000	1.0
Santa Cruz	0.7	700	750	800	850	900	950	997	1,025	0.6	46.4	130	0.6	13	1,155	0.6
Coast north of Bay	23.2	24,611	25,537	28,077	32,428	34,981	37,862	41,084	42,076	24.4	71.0	5,670	27.0	14	47,746	24.7
Sonoma	12.6	13,344	14,000	16,000	18,000	19,500	21,000	22,965	23,862	13.9	78.8	3,217	15.3	14	27,079	14.0
Napa	4.7	5,000	5,000	5,500	7,500	8,516	9,532	10,550	10,550	6.1	111.0	1,500	7.2	14	12,050	6.2
Solano	4.7	5,000	5,000	5,000	5,000	5,000	5,000	5,170	5,220	3.0	4.4	344	1.6	7	5,564	2.9
Lake	0.6	617	887	1,102	1,128	1,140	1,190	1,146	1,145	0.7	85.6	460	2.2	4	1,605	0.8
Mendocino	0.6	650	650	725	800	825	1,140	1,253	1,299	0.7	99.8	149	0.7	12	1,448	0.8
VALLEY DISTRICTS:	24.9	26,487	30,263	32,972	35,318	37,650	40,416	42,791	45,890	26.7	73.3	9,401	44.8	21	55,291	28.7
Sacramento Valley	16.1	17,126	20,863	23,072	25,368	27,650	30,349	32,784	34,872	20.3	103.6	8,431	40.2	24	43,303	22.4
Butte	5.7	6,005	6,005	6,444	6,882	7,230	7,354	7,479	8,250	4.8	37.4	133	0.6	2	8,383	4.3
Sutter	1.5	1,590	2,790	3,511	4,231	5,441	5,957	5,843	6,247	3.6	292.9	1,994	9.5	32	8,241	4.3
Colusa	2.5	2,600	2,600	2,600	2,700	2,700	2,759	3,832	4,091	2.4	57.3	1,246	6.0	31	5,337	2.8
Glenn	1.1	1,205	1,942	2,234	2,525	2,620	3,085	3,284	3,434	2.0	185.0	769	3.7	22	4,203	2.2
Tehama	0.8	905	905	1,486	2,066	2,358	3,064	2,968	3,291	1.9	263.6	892	4.3	27	4,183	2.2
Sacramento	1.6	1,670	2,187	2,243	2,300	2,457	2,500	2,776	3,148	1.8	88.5	809	3.9	26	3,957	2.0
Yolo	1.2	1,326	1,500	1,535	1,570	1,600	1,733	2,675	2,676	1.6	101.8	781	3.7	29	3,457	1.8
San Joaquin	0.8	900	1,124	1,179	1,600	1,600	1,594	1,594	1,625	1.0	80.6	450	2.1	28	2,075	1.1
Yuba	0.2	200	1,060	1,060	1,060	1,384	1,257	1,042	910	0.5	355.0	1,182	5.6	130	2,092	1.1
Shasta	0.7	725	750	780	800	800	1,046	1,292	1,200	0.7	65.5	175	0.8	15	1,375	0.7
San Joaquin Valley	8.8	9,361	9,400	9,900	9,950	10,000	10,067	10,007	11,018	6.4	17.7	970	4.6	9	11,980	6.2
Tulare	7.7	8,161	8,000	8,000	8,000	8,000	8,000	8,022	9,059	5.3	11.0	797	3.8	9	9,856	5.1
Fresno	0.8	800	1,000	1,500	1,550	1,600	1,650	1,699	1,699	1.0	112.4	128	0.6	8	1,827	0.9
Kern	0.3	400	400	400	400	400	417	286	260	0.1	−35.0	45	0.2	17	305	0.2
OTHER COUNTIES	2.9	2,977	3,219	3,449	3,510	3,843	3,947	3,676	4,127	2.4	38.6	593	2.8	14	4,720	2.4

Source of data:

Acreage data for 1921–1926 are revised figures of the California Cooperative Crop Reporting Service from N. I. Nielsen. Those for 1927 are from the 1926 and those for 1928 from the 1927 annual California Crop Reports. California Dept. Agr. Spec. Pub. 74:28; 1927; and 86:42; 1928.

TABLE 13

Size Distribution of California Prunes by Counties and Districts, 1925–1927
(In per cent of total of all sizes for each district or county)

County and district	18/31				32/40				40/50				50/60				60/70			
	1925	1926	1927	Average	1925	1926	1927	Average	1925	1926	1927	Average	1925	1926	1927	Average	1925	1926	1927	Average
California total	1.8	2.8	2.5	2.4	6.2	13.4	11.0	10.2	25.4	34.5	27.8	29.3	22.3	21.3	22.6	22.1	16.9	12.1	14.5	14.5
COAST DISTRICT	2.6	3.1	3.1	3.0	7.9	12.4	11.8	10.7	32.6	36.2	29.5	32.8	24.0	22.1	21.2	22.4	14.3	11.3	13.2	12.9
Coast south of Bay	1.5	2.2	2.1	2.0	7.0	13.7	8.6	9.5	29.9	34.7	28.0	30.9	25.4	22.6	22.3	23.5	15.7	11.7	14.5	14.0
Santa Clara	1.4	1.9	1.8	2.0	7.0	6.5	8.9	9.7	29.1	36.8	27.1	31.0	26.1	24.3	20.7	23.7	15.4	11.0	14.9	13.8
San Benito	3.3	3.9	6.6	4.6	7.2	11.5	15.5	7.5	37.3	20.4	38.2	32.0	18.5	24.3	20.7	21.1	18.3	17.0	8.8	14.7
Coast north of Bay	5.1	5.1	4.2	4.7	10.1	9.1	20.2	12.4	28.0	39.3	39.1	36.2	21.0	20.6	20.8	21.1	11.0	10.5	11.8	11.1
Sonoma	5.4	5.1	4.6	5.0	9.1	15.4	11.9	12.8	37.4	39.3	32.0	36.3	21.1	22.8	24.7	20.9	12.1	11.1	9.3	10.8
Napa	4.8	5.1	3.9	4.6	11.4	15.9	9.7	9.8	38.8	39.3	30.4	36.3	20.7	16.9	20.8	19.5	9.4	9.5	13.7	10.9
VALLEY DISTRICTS	0.6	2.1	1.5	1.4	3.7	20.6	12.4	12.6	15.1	30.4	25.3	23.6	19.8	18.6	24.7	22.7	21.0	14.0	16.6	17.2
Sacramento Valley	0.8	2.8	1.8	1.8	4.9	10.6	4.3	6.3	21.2	35.5	30.8	29.2	25.0	18.5	24.4	25.8	17.7	9.5	11.8	13.0
Butte	0.0	0.5	0.7	0.4	1.4	27.9	17.6	17.5	8.8	30.4	27.5	22.2	24.0	24.5	24.4	22.6	22.9	15.3	14.6	17.6
Sutter and Yuba	0.7	4.7	2.8	2.7	6.3	27.8	27.1	21.0	26.2	40.5	34.4	33.7	28.6	16.0	29.1	16.7	10.7	4.5	7.8	9.3
Colusa and Glenn	1.1	2.4	0.2	1.2	0.9	4.7	4.1	3.2	36.8	42.3	38.4	39.2	23.4	14.5	23.3	22.3	30.3	5.8	7.3	8.0
Tehama	0.1	0.4	0.0	0.2	8.3	16.2	10.5	11.7	16.7	20.3	17.9	15.3	23.6	23.8	12.1	22.5	16.5	19.2	26.2	25.2
Yolo	2.3	4.4	2.6	3.1	1.5	4.8	3.0	3.1	18.1	29.7	28.4	25.7	22.9	19.3	24.7	18.9	25.5	12.2	14.3	14.4
San Joaquin Valley	0.2	0.4	0.5	0.4	1.0	4.2	3.1	2.7	4.3	17.6	11.3	11.3	10.2	20.9	25.6	18.7	25.5	24.8	28.5	26.0
Tulare	0.0	0.1	0.3	0.2	2.5	8.1	3.7	4.8	4.2	18.3	11.3	11.1	10.9	19.8	25.3	18.7	26.8	26.5	30.0	27.8
Kings	0.5	1.8	1.4	1.2	1.2	4.3	0.8	2.1	5.2	21.2	11.1	12.5	9.8	23.4	23.4	18.9	23.0	16.4	25.6	21.6
Riverside									4.0	19.8	11.9	11.9	13.1	28.7	34.8	25.6	17.9	23.0	18.9	20.0

County and district	70/80				80/90				90/100				100/120				120/up			
	1925	1926	1927	Average	1925	1926	1927	Average	1925	1926	1927	Average	1925	1926	1927	Average	1925	1926	1927	Average
California total	10.5	6.9	9.5	8.9	6.2	3.2	5.0	4.8	3.8	2.2	3.3	3.1	3.2	1.5	2.4	2.4	2.6	0.8	0.9	1.4
COAST DISTRICT	8.2	6.6	9.3	8.0	3.6	2.7	4.3	3.5	2.8	2.0	3.6	2.8	1.8	1.3	2.5	1.9	1.6	0.7	1.0	1.1
Coast south of Bay	9.0	7.0	10.6	8.8	4.1	2.7	4.6	3.8	3.1	1.9	4.3	3.2	1.9	1.4	2.8	2.0	1.7	0.8	1.2	1.3
Santa Clara	9.2	6.3	10.9	8.8	4.1	2.3	5.0	3.8	3.1	1.9	4.8	3.1	1.9	1.2	3.0	2.0	1.8	0.7	1.3	1.3
San Benito	7.1	11.6	6.2	8.3	4.0	5.4	4.0	4.1	1.6	2.0	2.7	2.8	2.3	2.8	0.7	1.9	0.3	0.9	0.5	0.4
Coast north of Bay	6.3	5.9	7.7	6.6	2.6	2.7	4.0	3.1	2.2	1.8	2.0	1.9	1.6	1.2	2.1	1.6	1.3	0.6	0.1	0.9
Sonoma	6.7	5.9	7.0	6.6	2.3	3.2	3.8	3.0	2.0	1.7	2.3	1.9	2.0	2.0	2.1	1.9	1.3	0.6	0.1	0.6
Napa	5.6	5.8	8.3	6.6	2.9	2.4	4.8	3.6	2.5	2.1	3.3	2.6	1.6	2.3	2.1	1.6	1.4	0.7	0.9	1.0
VALLEY DISTRICTS	13.9	7.7	9.8	10.4	10.2	2.2	6.0	6.1	5.1	4.3	2.9	4.2	5.4	1.8	2.3	3.1	4.0	0.9	0.8	1.9
Sacramento Valley	10.3	5.1	8.0	7.8	7.1	3.0	4.3	4.8	4.4	1.6	2.8	3.0	3.5	1.6	2.2	2.4	3.3	0.8	0.7	1.5
Butte	12.8	6.8	10.2	9.9	11.8	0.9	5.4	7.4	3.8	0.9	3.7	3.6	5.0	3.5	3.2	4.0	6.2	1.8	0.9	3.0
Sutter	9.2	3.0	6.0	5.1	3.4	2.0	4.2	3.3	3.8	1.4	2.0	2.1	2.4	0.8	2.0	1.8	1.8	0.3	0.8	1.0
Colusa	6.9	1.6	5.7	4.8	5.4	0.5	2.5	3.3	1.7	0.4	2.3	1.5	3.4	0.8	1.3	1.8	2.3	0.3	0.8	1.2
Tehama	14.7	12.3	11.0	12.6	9.6	4.2	11.2	5.6	5.6	7.8	5.2	6.5	3.5	2.6	1.9	2.1	2.7	0.2	0.3	1.8
Yolo	11.1	9.4	8.9	9.8	7.3	4.2	5.2	5.6	6.3	2.7	2.2	3.5	2.5	0.8	1.9	2.1	2.8	0.2	0.3	1.1
San Joaquin Valley	19.3	13.9	14.2	15.8	14.9	7.2	10.2	10.8	6.3	5.8	3.2	5.1	8.3	2.6	2.3	4.8	5.1	1.2	0.8	2.4
Tulare	19.6	13.9	13.2	15.1	15.1	6.7	10.5	10.7	6.6	6.7	2.9	5.4	9.0	2.5	2.2	4.6	6.5	1.4	0.4	2.9
Kings	20.5	14.2	17.3	17.3	16.0	7.4	8.7	10.7	6.7	2.4	5.1	4.7	8.0	3.8	2.4	4.7	3.1	0.5	0.7	1.5
Riverside	26.8	12.4	18.3	19.1	19.9	8.0	10.1	12.6	2.9	2.0	0.9	1.9	9.6	0.9	3.5	4.6	4.2	0.8	0.5	1.8

Source of data:

Based upon tonnage figures representing an average of about one-half of the prunes produced in California during the years 1925–1927. The average is a simple average of the percentage data shown in this table. The percentages for counties and districts for individual years are true or weighted averages based upon tonnage data.

TABLE 14

UNITED STATES EXPORTS OF PRUNES BY COUNTRIES, 1897–1927

Year beginning July 1	Total	Germany	British Isles	Canada	France	Netherlands	Belgium	Scandinavia†	New Zealand	Mexico	All others
Millions of pounds, i.e., 000,000 omitted											
1897	15.9	5.7	2.2	1.2	3.8	1.6	1.2	0.1	*	*	0.1
1898	5.6	1.1	0.8	1.1	1.5	0.2	0.5	....	*	*	0.4
1899	25.9	8.5	4.7	1.6	3.6	4.7	1.8	0.6	*	*	0.4
1900	10.0	3.1	1.1	1.7	....	2.4	0.5	0.4	*	*	0.8
1901	23.4	7.5	3.6	3.4	1.0	4.2	2.2	0.7	*	*	0.8
1902	66.4	18.7	15.0	5.0	16.1	3.9	4.8	1.7	*	*	1.2
1903	73.1	20.4	9.1	4.3	22.8	8.1	5.2	1.7	*	0.2	1.3
1904	55.0	20.9	11.1	5.2	0.4	9.8	1.5	3.7	*	0.6	1.8
1905	24.9	6.2	6.4	5.6	0.2	2.3	1.5	0.9	*	0.1	1.7
1906	44.4	6.9	11.9	10.4	0.7	6.6	2.9	2.1	0.6	0.2	2.1
1907	28.1	8.6	3.8	6.7	0.1	2.8	1.9	1.8	0.7	0.2	1.5
1908	22.6	6.9	1.8	8.3	....	1.9	0.8	0.8	0.6	0.2	1.3
1909	89.0	36.6	12.4	10.6	5.3	8.5	7.3	4.7	1.0	0.3	2.3
1910	51.0	12.6	5.6	8.8	14.2	2.4	3.0	1.6	0.8	0.2	1.8
1911	74.3	31.4	6.6	13.5	6.2	2.3	6.8	3.1	1.0	0.2	3.2
1912	118.0	49.1	8.5	11.0	12.0	16.6	6.2	8.4	0.8	0.4	5.0
1913	69.8	17.4	11.2	12.8	13.5	6.4	1.7	2.8	0.7	0.1	3.2
1914	43.5	0.0	10.4	9.3	1.1	0.6	....	18.3	0.9	....	2.9
1915	57.4	0.0	15.0	11.9	4.9	2.5	....	17.9	1.0	0.1	4.1
1916	59.6	0.0	10.8	11.1	23.9	0.3	....	7.5	0.7	0.6	4.7
1917	32.9	0.0	4.8	18.0	2.5	....	....	0.2	....	....	7.4
1918	59.1	0.0	18.8	7.9	8.9	0.2	2.9	0.6†	....	....	....
1919‡	114.1	0.0	35.6	16.8	18.1	2.2	2.1	24.4	....	....	14.9
1920‡	57.5	16.7	15.5	11.3	1.7	2.5	1.6	4.6	0.4	0.9	2.3
1921‡	109.4	16.7	29.6	14.3	25.1	4.4	3.9	10.2	1.2	0.7	3.3
1922	79.2	0.3	18.9	14.0	26.6	1.8	2.5	7.6	1.5	1.0	5.0
1923	136.4	51.1	30.2	15.2	3.7	12.0	3.5	11.2	1.4	0.8	7.3
1924	171.8	55.0	31.6	14.8	20.2	15.6	4.8	15.6	1.6	0.9	11.7
1925	151.4	18.9	37.1	17.7	39.1	8.9	4.7	9.2	1.8	1.2	12.8
1926	175.5	38.6	40.2	20.5	27.2	10.2	6.0	14.6	1.9	0.9	15.4
1927	260.6	79.7	45.6	23.3	27.4	23.1	9.5	17.0	1.3	1.5	32.2
AVERAGES											
1899–03	39.8	11.6	6.7	3.2	8.7	4.6	2.9	1.0	*	*	0.9
1904–08	35.0	9.9	7.0	7.2	0.3	4.6	1.7	1.9	0.4	0.3	1.7
1909–13	80.4	28.4	8.9	13.3	10.2	7.2	5.0	4.1	0.9	0.2	3.1
1923–27	179.1	48.7	36.9	18.3	23.5	13.9	5.7	13.5	1.6	1.1	15.9
Percentage of United States total exports											
1899–03	100	29	17	8	22	12	7	3	*	*	2
1903–08	100	28	20	21	1	13	5	5	1	1	5
1909–13	100	35	11	16	13	9	6	5	1	–	4
1923–27	100	27	21	10	13	8	3	8	1	1	9

(...........) A dash indicates that quantity was so small that the Department of Commerce did not enumerate it separately but included it in export to "all other countries."

* An asterisk indicates that the quantity exported was not reported for the individual country and either amounted to nothing or was inconsequential.

† Scandanavia, as given, includes Noway, Sweden, and Denmark. Exports to Sweden were so small in 1918 that they were not given separately. Those to Norway and Denmark were 607,871 pounds.

‡ Right after the war actual net exports are not known. The export figures for 1919–1920 are too large as in several known instances large quantities of fruit which had been exported from the United States, especially during 1920, were returned and resold in our domestic market.

Source of data:

Compiled from U. S. Dept. Commerce, Foreign Commerce and Navigation of the United States, for the years 1897–1917; and from the June issues of the United States Monthly Summary of Foreign Commerce, for the years 1918 to date.

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